This section provides information for the Administrative Authority's consideration as required by Article IX, Section 1 of the Constitution of Louisiana. This section also fulfills the requirement to provide an Environmental Assessment Statement in accordance with LA.R.S. 30:2018(B).

8.1 HAVE THE POTENTIAL AND REAL ADVERSE ENVIRONMENTAL EFFECTS OF THE PROPOSED FACILITY BEEN AVOIDED TO THE MAXIMUM EXTENT POSSIBLE?

Marathon Petroleum Company LLC (MPC), Louisiana Refining Division (LRD) has planned the Garyville Major Expansion (GME) Project such that the potential and real adverse environmental effects of the proposed construction and operation activities will be avoided to the maximum extent possible. As discussed in further detail in this response, appropriate control technologies and operating practices will be utilized to avoid both potential and real adverse environmental effects.

The MPC Garyville Refinery is the newest petroleum refineries in the United States (U.S.). The facility was placed in service in 1976 after the promulgation of both the Clean Air Act and the Clean Water Act. This was also the same year the first New Source Performance Standards (NSPS) were promulgated by the U.S. Environmental Protection Agency (EPA). As a result, the refinery was designed and constructed with state-of-the-art pollution abatement equipment to meet these stringent standards. Consequently, none of the units required "grandfather" status because they all met or exceeded the NSPS requirements in place when the units were constructed. The refinery was constructed and continues to operate in a manner that ensures that the potential and real adverse environmental effects are avoided to the maximum extent possible.

The Garyville Refinery's commitment to environmental excellence, which ensures that the potential and real adverse environmental effects are avoided to the maximum extent possible, is evidenced by its 2002 induction into the National Environmental Performance Track (NEPT) program. This program was designed by the EPA to recognize companies for their achievements beyond compliance. The cornerstones of the program are a record of sustained compliance, community outreach, and an environmental management system that leads to continual improvement. Garyville is the first and only petroleum refinery in the nation accepted into this program.

MPC has already submitted a work plan, which has been approved by Louisiana Department of Environmental Quality (LDEQ), for Groundwater Certification for the proposed GME Project site to demonstrate that the proposed project will neither adversely affect the existing groundwater quality nor impede any proposed or ongoing subsurface assessment and/or remedial action.

8.1.1 Potential Adverse Environmental Effects

Potential adverse environmental effects can be divided into three categories. General adverse environmental effects include those that could be related to the project as a whole (i.e., proximity to sensitive areas, etc.). The other two categories include effects associated with the construction phase of the project, and those effects associated with the operation of the expanded facility.

8.1.1.1 General Effects

The proposed expansion area consists of two tracts. The GME Project process units will be constructed on an approximately 300-acre recently acquired tract located immediately east of and adjacent to the existing MPC refining complex, as shown in Figure 8-1. GME Project tanks will be constructed to the west side of the refinery in between the existing refinery tanks and the coker conveyor, also shown in Figure 8-1. Current usage of these tracts is agricultural (sugar cane production); however, remnants of an abandoned sugar refining mill are present within the east central portion of the east tract. A Phase I Environmental Site Assessment was conducted on this recently acquired 300 acres ("Phase 1 Environmental Site Assessment; 323-Acre Tract; Cargill, Inc. Property; Garyville, Louisiana; St John the Baptist Parish;" prepared by Environ International Corporation; Baton Rouge, Louisiana; January 16, 2004) for MPC. The report stated that the presence of the former mill did qualify as a recognized environmental condition (as defined by the American Society of Testing and Materials "Standard E 1527-00 – Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process"). However, the report went on to state the following:

> "Based on discussions with knowledgeable agency personnel [Mr. Steven Guidry, Chief Administrative Officer for the St. John the Baptist Parish Planning and Zoning

> Department] and the former owner, the sugar mill ceased operation in the 1920s, with no known environmental effects from operations. Based on the date of these operations, which predated synthetic agricultural chemicals, the likelihood that past operations have caused a recognized environmental condition is considered low." [Added]

Per the Phase I, there was no evidence of the presence of hazardous substances on the property. No evidence of aboveground or underground storage tanks was observed. There was no evidence of containers potentially containing polychlorinated biphenyls on the site. No evidence of current or historic oilfield activities was identified.

There is no potential for the proposed project to impact sensitive environmental receptors in the vicinity. The site has been cultivated for sugar cane production. There are no known threatened or endangered species that could be impacted by the project. A review of the files at the Louisiana Department of Culture, Recreation and Tourism, Office of Cultural Development, Division of Archaeology conducted as a component of the above-referenced Phase I Environmental Site Assessment revealed that no archeologically-significant artifacts have been reported to exist in the vicinity.

The GME Project is not anticipated to adversely affect the geology, topography, soils, vegetation, or food production in the vicinity. No adverse effect is anticipated with respect to either visibility or opacity in the vicinity or any Clean Air Act Mandatory Class I Federal Area, as the closest Class I Area, the Breton Wilderness Area, is over 174 kilometers to the east-southeast of the project site.

Accordingly, as demonstrated above, there are no general potential adverse environmental effects that would occur as the result of developing the site into a petroleum refinery.

8.1.1.2 Construction Phase Effects

The MPC Garyville Refinery has an outstanding record of project execution, and over the last ten years has constructed three large projects at the existing refinery. These projects all incorporated the best management practices, engineering practices, and regulatory requirements described in the following three sub-sections, which address each medium. The construction of the proposed GME Project will be handled with the same standards, thus

ensuring that the potential adverse environmental effects will be avoided to the maximum extent possible.

8.1.1.2.1 Air

During the construction phase, potential adverse air environmental effects primarily consist of increases in exhaust emissions from improperly operating earth-moving and construction equipment, as well as delivery vehicles during the construction phase. MPC inspectors and construction supervisors will notify equipment operators and delivery contractors if any equipment is observed to be performing poorly (e.g., as evidenced by black exhaust emissions), and require that the equipment be repaired or replaced.

Another potential adverse air environmental effect consists of excessive dust emissions during periods of dry weather. MPC construction inspectors and contract construction supervisors will make observations regarding the potential for excessive dust emissions, and will wet roads and trafficked areas as necessary.

8.1.1.2.2 Water

A potential adverse water environmental effect during the construction phase is excessive silt loading in stormwater exiting the construction site. As required, prior to commencing construction, MPC will submit a Notice of Intent to obtain coverage under the Storm Water General Permit for Construction Activities Five (5) Acres or More. A Stormwater Pollution Prevention Plan (SWP^3) will be prepared and implemented identifying Best Management Practices (BMPs) that will be employed to ensure that potential effects to the receiving waterbody will be minimized to the maximum extent possible. The SWP^3 will prescribe the implementation of BMPs in accordance with sound engineering practices to minimize the effects of stormwater discharged from the site to waters of the state.

Additional adverse environmental water effects could result from leaks or spills of fuel, hydraulic fluids, oil or other fluids from earth moving and construction equipment. The SWP^3 will include measures that will be adopted to ensure that effects of this nature are avoided to the maximum extent possible.

Other adverse environmental effects could result from a rupture of an oil or fuel storage vessel or transfer hose. MPC will include elements of the federal Spill Prevention, Control,

and Countermeasure (SPCC) requirements (see Title 40 of the Code of Federal Regulations, Part 112, [40 CFR 112]) within the SWP^3 to ensure that oil spills are avoided to the maximum extent possible. The SWP^3 will require that containment and other countermeasures are emplaced that will prevent oil spills from storage vessels from reaching waters of the state.

8.1.1.2.3 Solid and Hazardous Waste

The SWP^3 will also ensure that the potential adverse environmental effects associated with the generation of solid and/or hazardous wastes resulting from spills of oil or hazardous substances are minimized to the maximum extent possible. MPC Garyville will use its existing protocols for the proper management and characterization of any environmental medium (i.e., soil or groundwater) that has been contaminated as the result of a spill to ensure that it is disposed in accordance with applicable regulatory requirements (i.e., contaminated soil will be shipped offsite for disposal; groundwater will either be taken to an off-site treatment facility or transported to the wastewater treatment facility at MPC Garyville).

MPC will also implement a plan to ensure that general debris generated during construction activities is disposed in accordance with applicable regulatory requirements.

8.1.1.3 Operating Phase Effects

The potential adverse environmental effects of the proposed GME Project could result from a fire, an explosion, a security breach, or a combination of the three. Any of these incidents can affect any or all of the three environmental media: air, water and waste. MPC Garyville implements regulatory requirements and best practices to avoid these incidents to the maximum extent possible since it already has refinery operations at this location. The GME Project will be included in these requirements and practices. The refinery uses a tiered auditing program to ensure compliance and conformance with regulatory requirements and best practices. In the event an incident occurs, the refinery is ready for a comprehensive and competent response because the refinery has an inclusive Emergency Response Plan, called the One Plan, which is regularly exercised and a well-equipped Emergency Response Team, which is regularly trained.

Safety and environmental stewardship are priorities at the MPC Garyville Refinery. The refinery is a member of the Occupational Safety and Health Administration's (OSHA's) elite program, the Voluntary Protection Program (VPP). It is also a member of EPA's elite program, the National Environmental Performance Track (NEPT). The MPC Garyville Refinery has maintained STAR status in the VPP program since 1994. STAR status is the highest ranking available within the VPP, and is awarded only to exemplary worksites that have implemented comprehensive, successful safety and health management systems, and achieved injury/illness rates below their industry's national average. The NEPT is a voluntary partnership that recognizes top environmental performance among participating U.S. facilities of all types, sizes, and complexity. It includes both public and private facilities. Program partners provide leadership in many areas, including preventing pollution at its source. Currently, the program has about 400 members. To date, the LRD is the only petroleum refinery that has been inducted into the partnership.

Only fifty-five other facilities in the U.S. share the privilege of membership in both VPP and NEPT.

Cornerstones of both VPP and NEPT are management systems that lead to continual improvement.

8.1.1.3.1 Regulatory Requirements and Best Practices

Adoption of and compliance with OSHA's Process Safety Management (PSM) and EPA's Risk Management Program (RMP) regulations, implementation of the United States Coast Guard (USCG) required Facility Security Plan (FSP), and adoption of and conformance with voluntary best practices including partnering with local, state and federal authorities will avoid to the maximum extent possible any potential adverse environmental effects of refining operations.

- The PSM program, implemented pursuant to OSHA regulation 20 CFR 1910, is designed to prevent or minimize the consequences of catastrophic releases of toxic, reactive, flammable, or explosive chemicals to employees of a facility. It entails the development of a written plan of action regarding employee participation as well as consulting with employees on the conduct and development of process hazard analyses and on the development of other elements of process safety management required under the rule. Process

hazard analyses will be conducted for all applicable activities; corrective action will be taken where unacceptable risks are identified.

- The 1990 Clean Air Act Amendments required EPA to publish regulation 40 CFR 68 and guidance for chemical accident prevention at facilities using extremely hazardous substances under the RMP. Many of the components of the RMP overlap with the requirements of the PSM. While the PSM is intended to protect facility employees, the RMP is intended to protect surrounding communities. The following key additional elements are required in the RMP:

  - MPC will update its hazard assessment that details the potential off-site effects of an accidental release, including a re-evaluation of worst-case scenarios and alternative accidental releases.

  - MPC's emergency response program provides emergency health care information on the proper first aid treatment for exposure. It also provides employee training for informing the public and response agencies (e.g., the fire department) should an incident occur.

- Since the refinery has docks on the Mississippi River, the USCG, as part of the Department of Homeland Security, regulates the refinery's security program. The refinery has a USCG approved FSP and participates with the USCG and other authorities in security drills and training.

8.1.1.3.2 Auditing

The refinery is audited for compliance and conformance through a tiered audit program including:

- The refinery has an established Health, Environmental, Safety, and Security Committee that consists of representatives from all disciplines and groups of employees including fixed-based contractors. This 234-member committee (i.e., 200 MPC employees and 34 contractors) performs monthly safety, environmental and security audits to ensure compliance with OSHA, EPA, and LDEQ regulations. The results of the audits are reported to management monthly. Findings are entered into a database; a responsible person is

assigned to address the findings and progress towards resolution is tracked to completion.

- Every two years the refinery undergoes a comprehensive third party compliance audit of its environmental, safety and security programs.
- MPC Corporate audits conformance with the voluntary standards of the American Chemistry Council's (ACC's) Responsible Care® Management System. These audits are conducted every three years.
- OSHA and EPA also audit conformance with VPP and NEPT requirements on a 3-5 year cycle.

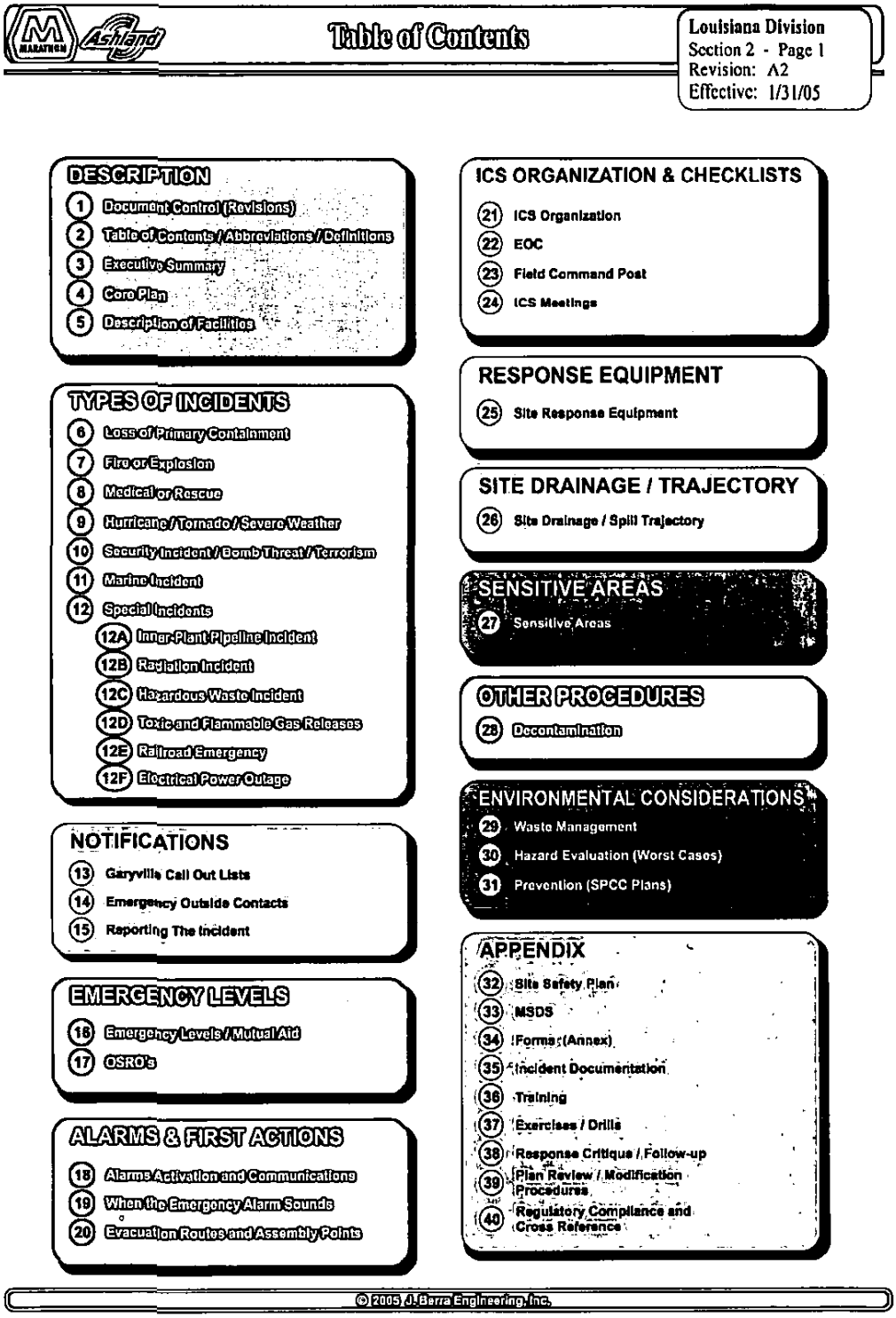
8.1.1.3.3 Emergency Response

The MPC Garyville Refinery has elected to combine several of the plans discussed in this response into an Integrated Contingency Plan, also known as the One Plan, in accordance with guidance issued by the federal National Response Team (NRT). Table 8-1 (Page 8-9) lists the contents of the One Plan, which demonstrates that appropriately trained people and equipment are in place such that potential adverse environmental effects from emergency incidents will be avoided to the maximum extent possible.

The Garyville Refinery maintains a large comprehensive Emergency Response Team (ERT) that is well-equipped and extensively trained. The team is comprised of the following: the Shift Emergency Response Team, which is trained to meet the OSHA fire brigade standard; the marine dock operators who are trained for initial oil spill response; the Voluntary Emergency Response Team, which is trained to higher levels of fire fighting skills; the Rescue Team, which is composed of first responders and Emergency Medical Technicians (EMTs); and the Air Monitoring Team, which is trained to use air monitoring instruments to do both fenceline and community monitoring in response to odor complaints and emergency incidents. The employees that participate in the Voluntary Emergency Response Team, Rescue Team, and Air Monitoring Team are all volunteers.

The One Plan and the ERT are regularly exercised and drilled. Drills include participation with local, state and federal authorities.

Table 8-1
One Plan Table of Contents



Carefully planned training is conducted on a regular basis in the areas of safety, health, environmental, and security to ensure employees are well-equipped to effectively meet MPC's stringent objectives, as well as OSHA standards, LDEQ, La. State Police, USCG, and EPA requirements.

To further minimize air adverse environmental effects, three ambient air monitoring stations installed in March 2003 are used to ensure the safety and health of adjacent communities. Since installation, no violations of applicable standards have been detected. These ambient air monitoring stations were voluntarily installed by MPC. The data are shared with the LDEQ and the local Community Action Panel.

The following are examples of the MPC Garyville Refinery's commitment to environmental, health, safety and security excellence:

- The MPC Garyville Refinery has compiled one of the best safety records in the refining industry, and annually ranks as one of the top U.S. refineries for safety.
- In 2000, the Garyville Refinery was one of only two facilities nationwide to receive the National Petroleum Refiners Association's (now the National Petrochemical and Refiners Association, [NPRA]) prestigious Distinguished Safety Award. The Distinguished Safety Award is only presented to those sites with outstanding safety performance and programs.
- Employee Industrial Hygiene Monitoring Programs are routinely conducted to ensure that personnel do not receive any exposure in excess of OSHA limits.
- In 1996, the Garyville Refinery was named a charter member of LDEQ's Louisiana's Environmental Leadership Program (LaELP), which is a consortium of environmental groups, industrial facilities and regulatory agencies. Under this program, the Garyville Refinery has received twelve Governor's Awards for pollution prevention, community outreach, and environmental management systems.
- MPC Garyville has voluntarily hosted annual workshops for LDEQ and EPA Region VI since 1992. It has also been an active participant in the LDEQ's annual Conference on Waste and the Environment.

- The Garyville Refinery received the 2001 Conservation Corporation of the Year award from the Louisiana Wildlife Federation for outstanding contribution to use and management of Louisiana natural resources.
- In 2003, the refinery was accepted into EPA's National Partnership for Environmental Priorities Program.
- The refinery was accepted into the EPA's voluntary Early Reduction Program for Air Toxics under the Clean Air Act Amendments of 1990. In this program, the refinery reduced toxic air pollutants from five point sources by a total of 136,000 lbs (68 tons). These voluntary emissions reductions were achieved approximately three years ahead of schedule. The Garyville Refinery was the only petroleum refinery to participate in this national program.
- The Garyville Refinery has been modeled for all criteria and toxic pollutants, and has demonstrated compliance with all applicable Ambient Air Standards. The refinery passed the first phase of the EPA's Ambient Air Standards with emissions reaching only about 7.5 percent of significant threshold levels. This point is further solidified by the fact that the Environmental Defense Fund ranked Garyville as one of the lowest emitters of toxic pollutants among petroleum refineries.
- In 2000 Marathon Ashland Petroleum now MPC, signed the guiding principles of the ACC's Responsible Care® program. At that time, NPRA of which MAP was a member, had a partnership with ACC on implementation of Responsible Care®. In 2006, MPC, still a member of NPRA, joined ACC to pursue full implementation of Responsible Care®. The Responsible Care® Management System includes safety, environmental stewardship, security, and, raw material and product stewardship.

These examples further demonstrate that the MPC Garyville Refinery will avoid adverse potential environmental effects of the GME Project to the maximum extent possible.

8.1.2 Real Adverse Environmental Effects

8.1.2.1 Construction Phase Effects

The MPC Garyville Refinery has an outstanding record of project execution and over the last ten years has constructed three large projects at the existing refinery. These projects all incorporated best management practices, engineering practices, and regulatory requirements to ensure that the real adverse environmental effects occurring as the result of construction activities were avoided to the maximum extent possible. The construction of the proposed GME Project will be handled with the same standards.

As a real environmental effect, there will be the necessity to handle the vehicle traffic of the construction workers. The GME Project team will work with the St. John the Baptist Parish Sheriff's Office and the Louisiana State Police to minimize the traffic impact on the local community. If necessary, the GME Project will secure remote parking lots and bus workers to the construction site.

8.1.2.2 Operating Phase Effects

8.1.2.2.1 Air Quality

New Source Review (NSR) requires stationary sources of air pollution to get permits before they start construction. NSR is also referred to as construction permitting or preconstruction permitting. For the MPC GME Project, NSR is required.

The Clean Air Act Amendments of 1990 required EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The Clean Air Act established two types of NAAQS, primary and secondary. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. The EPA has set NAAQS for six pollutants, which are called "criteria" pollutants. These include carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_X), Particulate Matter 10 and 2.5 (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2), and volatile organic compounds (VOCs).

Regions where monitoring data demonstrate that the NAAQS are met are designated as attainment areas. If one or more of the standards are exceeded in a region, that area is designated non-attainment. St. John the Baptist Parish (the Parish) is in an attainment area with respect to all NAAQS.

The MPC Garyville Refinery has voluntarily installed a three-station Ambient Air Monitoring Network. Each station contains both a high volume particulate air filter and dual Summa Canister sampling systems. All sampling systems meet EPA sampling protocol methodology. Under normal operation, the high volume particulate air sampler and one of the Summa Canisters cycle through the EPA weekly sampling protocol for collecting a 24-hour sample. The other Summa Canister is available to be activated by telephone modem if a release were to occur, and would take an instantaneous sample. All analyses are conducted by EPA specified methods by a lab that follows recognized quality assurance and quality control protocol. To date, no violations of applicable standards have been detected. The data are shared with the LDEQ and the local Community Action Panel.

Prevention of Significant Deterioration (PSD) applies to new major sources or major modifications to existing sources for pollutants when the area in which the source is located is designated attainment or unclassifiable for NAAQS. It requires the following:

- installation of the Best Available Control Technology (BACT);
- an air quality analysis;
- an additional impact analysis; and
- public involvement.

With respect to public involvement, the Garyville Refinery has already held two public meetings with members of the local community to ensure they are aware of MPC's interest to expand the refinery and to provide preliminary facts. Furthermore, the refinery plans to hold additional open houses and public meetings in order to have an open dialogue with the public such that the public's interests concerning the GME are heard. The Garyville Refinery will make every effort to address or incorporate these concerns into the design of the GME project.

BACT is an emissions limitation, which is based on the maximum degree of control that can be achieved. It is a case-by-case decision that considers energy, environmental, and economic impacts. BACT can consider add-on control equipment or modification of the production processes or methods. This includes removal of contaminants from fuel and innovative fuel combustion techniques. BACT may be a design, equipment, work practice, or operational standard if an emissions standard is infeasible.

The purpose of the air quality analysis is to demonstrate that new emissions emitted from a proposed major stationary source or major modification, in conjunction with other applicable emissions increases and decreases from existing sources, will not cause or contribute to a violation of any applicable NAAQS or PSD increment. The analysis involves: (1) an assessment of existing air quality, which includes ambient monitoring data and air quality dispersion modeling results; and (2) predictions using dispersion modeling of ambient concentrations that will result from the applicant's proposed project and future growth associated with the project.

PSD does not prevent sources from increasing emissions. Instead, PSD is designed to:

- protect public health and welfare;
- preserve, protect, and enhance the air quality in national parks, national wilderness areas, national monuments, national seashores, and other areas of special national or regional natural, recreational, scenic, or historic value;
- ensure that economic growth will occur in a manner consistent with the preservation of existing clean air resources; and
- assure that any decision to permit increased air pollution in any area is made only after careful evaluation of all the consequences of such a decision and after adequate procedural opportunities for informed public participation in the decision making process.

The PSD increment is the level of emissions that is allowed to increase in an area. PSD increments prevent the air quality in clean areas from deteriorating to the level set by the NAAQS. The NAAQS is a maximum allowable concentration "ceiling." A PSD increment,

on the other hand, is the maximum allowable increase in concentration that is allowed to occur above a baseline concentration for a pollutant. The baseline concentration is defined for each pollutant as the ambient concentration that existed at the time that the first complete PSD permit application affecting the area was submitted. Significant deterioration would occur if the amount of new pollution exceeds the applicable PSD increment.

The detailed BACT analysis is presented in Section 5 of this application. The federal PSD regulation 40 CFR 52.21 [j] and Louisiana Air Quality Regulation LAC 33:III.509.J both require new major sources of air pollution to apply BACT for each regulated pollutant for which the potential to emit (PTE) is significant. BACT is a top down analysis determined on a case-by-case basis, with consideration given to the technical and economic feasibility of reducing or eliminating emissions. As demonstrated below, for certain of the applicable emissions, the MPC GME Project selected control technologies that were more stringent than a strict application of the BACT analysis would require. As such, real adverse environmental effects will be avoided to the maximum extent possible.

The PTE for the GME Project is significant for the following regulated pollutants:

Table 8-2
Constituents Subject to GME BACT Analysis

Source Description	Pollutant
Process Heaters and Boilers	NO_X
	CO/VOC
	PM_{10}
	SO_2
Sulfur Recovery Unit (SRU)	SO_2
	Hydrogen Sulfide (H_2S)
SRU Equipment Leaks	H_2S
SRU Thermal Oxidizer	NO_X
	CO
	PM_{10}
	VOC
Storage Tanks	VOC
Cooling Tower	VOC
	PM_{10}
Fugitive Emissions	VOC
I.C. Engines	Criteria Pollutants

Table 8-2 (Continued)
Constituents Subject to GME BACT Analysis

Source Description	Pollutant
Coker Unit/Coke Handling	PM_{10}
Wastewater Treatment Plant	VOC and combustion emissions
Marine Loading	VOC and combustion emissions
GME Emergency Flare	Criteria Pollutants
Fluid Catalytic Cracking Unit (FCCU) Regenerator Vent	NO_X
	CO/VOC
	PM_{10}
	SO_2

A BACT analysis was conducted to determine appropriate emission control technologies for each of the units listed above. As previously stated, the detailed information is presented in Section 5; however, the conclusions of the analysis are relevant with respect to demonstrating that adverse environmental effects are avoided to the maximum extent possible.

Comprehensive Emission Reduction – Process Heaters and Boilers

The existing refinery, as will the GME Project, maximizes the use of counter-current heat exchange between hydrocarbon process streams. This reduces the size of heaters, fuel consumption, and associated combustion emissions.

NO_X – Process Heaters and Boilers

Control technologies for NO_X emissions from refinery process heaters and boilers are segregated into two categories: 1) combustion controls; and 2) post-combustion controls.

Combustion Controls

- **Low – NO_X Burners (LNBs)** alter the air-to-fuel ratio in the combustion zone by staging the introduction of air to promote a lean-premixed flame. This results in lower combustion temperatures and reduced NO_X formation.

- **Ultra Low – NO_X Burners (ULNBs)** also alter the air-to-fuel ratio in the combustion zone by staging the introduction of air to promote a leaner-premixed flame; however, it additionally provides internal flue gas recirculation. This results in even lower combustion temperatures, further reducing NO_X formation.

- **Flue Gas Recirculation (FGR)** consists of recirculation of exhaust flue gases back to the combustion chamber. The exhaust gases, being lean in oxygen, act as a diluent gas to quench the flame temperature, and thereby inhibit NO_X formation. FGR is applicable to refinery boilers; it is not an option for refinery heaters.

LNB technology is regarded as a reliable and widely used emission control technology, offering 50 to 75 percent reductions below conventional burners. However, because its reduction efficiency is less than ULNB, the BACT analysis determined that ULNB would be established as the minimum combustion technology utilized for NO_X control.

For the proposed refinery boilers, the BACT analysis determined that ULNB in combination with FGR technology is successful in minimizing NO_X emissions to the maximum extent possible (i.e., equivalent to the reduction efficiency of ULNB and post-combustion control for a heater). ULNB in conjunction with FGR will be provided for the proposed GME boilers.

Notwithstanding two exceptions, all approved BACT options for refinery process heaters and boilers nationwide have been ULNBs. The two exceptions are: Selective Catalytic Reduction was required for a refinery near a Class I area (Arizona Clean Fuels in Yuma County) and in an ozone non-attainment area (Lyondell-Citgo Refining in Harris County, Texas). As the result of the BACT analysis, ULNBs were selected as the appropriate combustion technology for the GME Project.

Post-Combustion Controls

Although ULNBs were chosen as the appropriate combustion NO_X emissions control technology, additional reduction technologies were considered to determine whether further

reductions could be achieved beyond combustion controls. These technologies are post-combustion in nature.

- **Selective Catalytic Reduction (SCR)** is a flue gas treatment technology that uses ammonia as a reagent to reduce NO_X to molecular nitrogen and water in the presence of a metal oxide catalyst. Due to advances in catalyst design, commercial applications of this technology are successful over an extended temperature range. SCR was therefore determined to be technically feasible.

- **Selective Non-Catalytic Reduction (SNCR)** consists of the introduction of ammonia or other appropriate reducing agent to the post-combustion exhaust in a high-temperature environment (1,600°F-2,100°F). It has been shown to be effective on a large-scale basis; however, the process heaters and boilers applicable to the proposed GME Project are not large enough to achieve these post-combustion temperatures. Because it would be necessary to install exhaust heating systems (requiring significant energy consumption), this technology was determined to be technically infeasible for the proposed GME Project.

- **Non-Selective Catalytic Reduction (NSCR)** is a flue gas treatment technology that is similar to the catalytic controls on modern automobiles. Precious metal catalysts are used to promote reactions that reduce most NO_X in the exhaust gases to molecular nitrogen (N_2). Catalyst modules are located in the exhaust duct just downstream of the combustion chamber where temperatures are sufficiently high for reaction. Operating conditions for NSCR require rich-burn air-to-fuel ratios with less than 4% oxygen present. The refinery heaters and boilers will be equipped with a lean-burn burner technology that typically results in more than 4% oxygen in the flue gas; therefore, NSCR is not technically feasible.

- **$SCONO_X^{TM}$** is a technology that operates similarly to NSCR with a practical heater flue gas exhaust stream temperature range of 300°F to 700°F. However, it has not yet been successfully demonstrated that this technology will be suitable for heaters that use refinery gas as the fuel source. To date, it

has only been demonstrated to be suitable for units utilizing natural gas as a fuel.

Although ULNB technology is the appropriate NO_X BACT for the proposed GME Project, SCR will be installed in addition to the ULNB technology for five of the largest heaters in the project. The installation of SCR in addition to the ULNB technology would not be justified for the smaller heaters because the minimal amount of NO_X removed would render the SCR economically infeasible. Furthermore, though not required by regulation, MPC will install NO_X continuous emission monitors (CEMs) on the thirteen process heaters with design firing rates above 100 MM BTU/hr. Therefore the combination of ULNB and SCR on five of the largest heaters, and the installation of CEM's on the thirteen heaters above 100MM BTU/hr will ensure that NO_X emissions will be avoided to the maximum extent possible.

CO and VOCs – Process Heaters and Boilers

Control options for CO and VOCs consist of fuel specifications, combustion control, or post-combustion controls. Emission control methods for CO and VOCs that are commercially available for refinery process heaters and boilers include, in order of increasing control effectiveness:

- Gaseous Fuel Specification for Improved Combustion Efficiency
- Proper Burner (LNB or ULNB) Design and Operation
- Catalytic Oxidation for CO/VOCs alone
- SCR with Added Catalytic Oxidation
- $SCONO_X$™

Refinery fuel gas is a byproduct of refining operations, and its composition varies. As such, it is not technically feasible to make refinery fuel gas that meets a gaseous fuel specification comparable to pipeline-quality natural gas (which is the only way that this technology standard can be met). Due to material balance constraints and to avoid excess emissions, the refinery must maximize the utilization of refinery fuel gas for fuel-fired equipment. Therefore, a gaseous fuel specification is not a technically feasible option.

ULNB technology has advanced significantly, decreasing CO as well as NO_X emissions to lower levels. It is commonly thought that a trade-off exists when using ULNB technology, such that both NO_X and CO emission levels cannot be avoided simultaneously. However, by limiting air and fuel flow rates to vendor specifications, satisfactory fuel efficiency and emission performance can be achieved.

Catalytic oxidation of CO and VOC gases requires a catalyst bed located in the heater or boiler exhaust. For maximum reduction of CO, catalytic oxidation requires elevated temperature conditions typically between 800°F and 1,200°F. Oxidation of VOCs occurs efficiently in a lower temperature range (300°F to 800°F). However, although catalytic oxidation is proven for certain gas-fired equipment, it has not been widely implemented for refinery service outside of CO non-attainment areas. In fact, the BACT analysis indicated that CO/VOC catalytic oxidation has not been used on refinery heaters/boilers. Further, the use of CO/VOC catalyst has been shown to increase the oxidation of SO_2 that is present in the exhaust, which causes adverse impacts for units equipped with SCR systems. The CO/VOC oxidation catalyst effectively oxidizes the SO_2 normally present in the refinery gas-fired heater exhaust to sulfite (SO_3) and sulfate (SO_4). These species react with excess ammonia in the SCR Unit to create sub-micron sized ammonium bisulfate salt particles that appear in the form of secondary PM_{10} and opacity plumes. These particles also penetrate the SCR porous catalyst structure, and reduce its effectiveness. Because SCR will be installed on five of the largest heaters, catalytic oxidation was therefore rejected as technically infeasible.

As previously discussed for NO_X control, SCONO$_X$™ was found to be technically infeasible and rejected.

Because of the technical impracticality of add-on control technologies, proper design of burner and firebox components in the heaters and boilers will minimize CO and VOC emissions. All existing and new heaters and boilers are or will be equipped with continuous, on-line oxygen analyzers, which allow operation within an oxygen envelope that ensures maximum combustion of fuel gas to CO_2 and water, thus minimizing emissions of both CO and VOCs. Both high and low level alarms in the Central Control Room warn operators to adjust the combustion air up or down to maintain the proper oxygen envelope; therefore, these emissions will be avoided to the maximum extent possible.

PM_{10} – Process Heaters and Boilers

Emissions of PM_{10} from gas-fired heaters and boilers are primarily a result of unburned fuel that agglomerates to form particles. Such particles pass through the firebox and are emitted in the exhaust gas. Particulate matter emissions from refinery gas and natural gas-fired heaters and boilers are inherently low because of high combustion efficiencies.

The control options available for PM_{10}, in order of increasing effectiveness are:

- Proper Burner (LNB or ULNB) Design and Operation
- Post-Combustion Particulate Matter Control
- Gaseous Fuel Specification for improved combustion efficiency

As demonstrated during the evaluation of a gaseous fuel specification for CO/VOC control, this option is also not feasible for PM_{10} control. Refinery fuel gas is a byproduct of refining operations, and its composition varies. As such, it is not technically feasible to make refinery fuel gas that meets a gaseous fuel specification comparable to pipeline-quality natural gas (which is the only way that this technology standard can be met). Due to material balance constraints and to avoid excess emissions, the refinery must maximize the utilization of refinery fuel gas for fuel-fired equipment. Therefore, a gaseous fuel specification is not a technically feasible option.

Post-combustion particulate matter control was determined to be ineffective as a mechanism for controlling PM_{10} emissions. Potential controls consist of either a dry electrostatic precipitator, or a wet electrostatic precipitator. These technologies are effective on heaters and boilers fired with heavy fuel oils, coal, and petroleum coke, where PM_{10} formation is more prevalent because of potentially less efficient combustion and the high ash content of these fuels. These post-combustion technologies would not be economically feasible for a heater firing refinery fuel gas because there is not enough PM_{10} generated to warrant post-combustion control, unless the combustion chamber would become overly fuel rich.

Therefore, the proper technology is to control the fireboxes of the new heaters and boilers to have proper air-to-fuel ratios through effective combustion controls. By specifying ULNB

technology for the GME Project, the process heaters and boilers will have the proper air-to-fuel ratio, temperature, and combustion zone turbulence necessary to maintain low PM_{10} emission levels. All existing and new heaters and boilers are or will be equipped with continuous, on-line oxygen analyzers, which allow operation within an oxygen envelope that ensures maximum combustion of fuel gas to CO_2 and water, thus minimizing formation and emission of PM_{10}. Both high and low level alarms in the Central Control Room warn operators to adjust the combustion air up or down to maintain the proper oxygen envelope. As a result, these emissions will be avoided to the maximum extent possible.

SO_2 – Process Heaters and Boilers

SO_2 emissions can be controlled by either removing the sulfur from the fuel before it is burned to SO_2 or by post-combustion removal of SO_2 from the flue gas. The amine absorbers, which are part of the processes to remove sulfur from crude oil intermediates, necessary to make environmentally acceptable products, are also available to scrub sulfur from the fuel gas prior to its being introduced into the heaters and the boilers. For the GME Project, as well as the existing refinery, MPC Garyville has committed to a sulfur limit in fuel gas of 25 ppmv as H_2S on an annual average, which is significantly below the NSPS and BACT requirements.

Post-combustion control for SO_2 can be accomplished by utilizing a reagent scrubbing system, generally termed Flue Gas Desulfurization (FGD). This type of technology is well established for certain types of emission sources such as large, coal-fired power plant boilers or Fluid Catalytic Cracking Unit (FCCU) flue gas scrubbers. The installation of FGD in addition to the fuel gas scrubbing would not be justified because the minimum amount of SO_2 removed would render the FGD economically infeasible. For more information see Section 5, The BACT Analysis.

SO_2 and H_2S – Sulfur Recovery Unit (SRU)

Crude oil contains sulfur, which must be removed as part of the refining process to make environmentally acceptable products. The sulfur in the crude is removed in the form of H_2S.

The H_2S is converted to elemental sulfur for sale as a byproduct in the Claus Units, named after the man who invented the reaction. The three existing SRUs at the refinery also use

this process. This process combusts one-third of the H_2S to SO_2 and then reacts the SO_2 with the remaining H_2S in the presence of a fixed bed catalyst to form elemental sulfur.

BACT for sulfur conversion has been established at a range between 95.0 and 99.9 percent. For the GME Project, MPC Garyville has committed to achieve greater than 99.9 percent conversion efficiency. To achieve this degree of efficiency, three distinct stages will be required in the Claus process. The stages include a reactor, sulfur condenser, and a Tail Gas Treatment Unit (TGTU) to recycle unreacted sulfur in the form of H_2S. The three stages are collectively known as a Claus train, a sulfur train or SRU. Two new Claus recovery trains will be constructed and placed in parallel with the existing three trains. Having the units in parallel along with having oxygen available to enrich the combustion process provides a significant enhancement to limiting sulfur emissions. If this enhancement were not available in the event of the loss of one of the SRUs, the H_2S that was routed to that unit would need to be sent to an emergency flare for combustion to SO_2. With this enhancement, which is already available for the existing three trains and will be part of the proposed expanded five Claus train complex, the H_2S from the lost unit will be distributed over the remaining units with increased oxygen, and no H_2S is sent to the flare.

In addition to the above-described enhancement of oxygen enrichment, the Garyville Refinery has a sulfur shedding strategy that further reduces the potential for SO_2 emissions. If an SRU is down either for maintenance or a mechanical problem, and the rest are using oxygen enrichment to maintain refinery capacity, and if another SRU would go down, automated operational controls will begin to reduce throughput in the units that generate H_2S, and if necessary shut down those units.

The maximum 0.1 percent unreacted sulfur in the form of waste gases containing a small amount of unabsorbed H_2S will be combusted to SO_2 in the Thermal Oxidizer at the end of the TGTU. The NSPS and NESHAP standards for this emission source is 250ppmv SO_2, and presently, the Garyville Refinery is far below that requirement. To stay below the NSPS and NESHAP standards post-GME, the Garyville Refinery recently retrofitted its existing three SRUs with steam fired reheat on the sulfur condensers and added increased amine recirculation in the TGTUs. The GME SRUs will also be constructed to operate below NSPS and NESHAP standards. The five Thermal Oxidizers will have a limit of 93.41ppmv SO_2. The Thermal Oxidizer is a combustion device that uses either refinery gas and/or natural gas as supplemental fuel to ensure complete combustion of sulfur compounds to SO_2.

To maintain high sulfur conversion efficiency and avoid excess SO_2 emissions, MPC will also construct supplemental tankage for sour water and amine solutions. In the event of SRU/TGTU downtime, this design measure will allow for a process transition to balance the load between the remaining units without the need for oxygen enrichment.

Other design and operational features to prevent emissions and promote Claus Train efficiency include:

- Hydrocarbon contaminants in the feed streams to the SRU can affect performance and reliability by fouling the catalyst. By designing adequate retention time for oil-phase separation in the Sour Water Stripper and Amine Regeneration Units, hydrocarbon carryover will be minimized. The sour water tank will be provided with an external floating roof tank and seal design to further minimize emissions.
- Releases of residual dissolved H_2S from the elemental sulfur product that accumulates in the Sulfur Pit represent small, but recoverable air emissions. These H_2S emissions will be captured and recovered at high efficiency by recycling the Sulfur Pit gas back to the front end of the SRU

H_2S leaks can occur from SRU equipment connection components and valves; post-maintenance inspections will be conducted prior to returning any equipment component into service to ensure that all connections are properly fitted. H_2S monitors with audible alarms will be placed at strategic locations within the SRU. In addition, personnel are provided with personal H_2S detectors.

Other potential sources of H_2S emissions are the new sulfur storage tank and transport vessels. From the tank, the liquid sulfur product is loaded into transport vessels for shipping. The tank and transport vessels represent a source of H_2S emissions due to volatilization of the residual gas in the liquid sulfur product. To control these emissions, MPC Garyville will de-gas the liquid sulfur product in the new sulfur pits. As stated above, the vent gas from the pits will be recycled back to the front end of the SRUs.

NO_X, PM_{10}, CO and VOCs – SRU Tail Gas Treatment Unit Thermal Oxidizer

The two Thermal Oxidizers will also emit products of combustion such as NO_X, CO, PM_{10}, and VOCs. The proposed fuel source for this thermal oxidation unit is a blend of refinery gas and pipeline natural gas.

The Thermal Oxidizers are of critical importance to the safe operation of the SRUs. LNB and ULNB technology is not available for combustion devices of this nature, which do not allow staged introduction of fuel and air streams. Accordingly, minimizing these emissions will be accomplished by controlling both the flame temperature and the air--fuel ratio. These will be modulated using feedback control from continuous on-line oxygen analyzers. This form of combustion control is the only commercially available option for this type of emission source. This same control technology is employed on the existing three Thermal Oxidizers.

VOCs – Storage Tanks

The GME Project proposes the installation of 15 new large cylindrical tanks for the storage of gasoline, crude oil, sweet kerosene, ultra-low sulfur diesel, No. 6 Fuel Oil, and sour water from increased refinery operations. In addition, existing floating/fixed roof tanks will have increased product throughput. Accordingly, MPC Garyville will request permit limit increases for those existing tanks.

Storage tanks below certain sizes or those storing materials with low vapor pressure thresholds are exempt from requirements for the installation of emission controls. For instance, the proposed fixed roof No. 6 Fuel Oil tank (described below) is not required to provide any emission controls due the low vapor pressure of the No. 6 Fuel Oil. Other existing tanks at the facility have vapor pressures less than regulatory thresholds (i.e., <1.5 psia for National Emission Standards for Hazardous Air Pollutants CC and <0.5 psia for NSPS Kb) and therefore do not require emission controls.

For tanks requiring emission controls, the following technologies are applicable:

- Pressurized dome (sphere) with a closed vent system and control device;
- Internal floating roof tank with appropriate seal design; and

- External floating roof with appropriate seal design.

MPC Garyville proposes to install one new No. 6 Fuel Oil tank in connection with the GME Project. No. 6 Fuel Oil has a low vapor pressure, and the PTE for VOCs is insignificant. The new tank for this service will be a fixed-roof tank.

MPC Garyville recently voluntarily acquired a state-of-the art instrument called a "ThermaCam GasFind IR" that uses thermal imaging to detect vapor leaks, which will be used during seal inspections.

The remaining new storage tanks will be of external floating roof design. VOC emissions from floating roof tanks result from two methods. The first method, known as standing storage loss, results from evaporative loss of the stored liquid around the floating roof seals and mechanical roof fittings. These emissions are minimized by routine inspection of the floating roof seals to ensure their integrity. The second loss method, known as working or withdrawal/clingage loss, results from exposed liquid on the tank wall. These emissions are minimized by installing floating roofs that have both primary seals and secondary seals with integral wipers. Again, routine inspections of the floating roof seals for integrity minimize these emissions. These are the type of floating roofs that MPC Garyville will install on the new tanks and is indeed the same technology used on the refinery's existing tanks.

Further reduction in VOC emissions could be achieved by installing internal floating roofs on these tanks, recovering the VOC vapor between the internal floating roof and the external dome roof, and routing that vapor to a vapor combustor. However, the environmental benefit of doing this is diminished since the vapor combustor would have combustion emissions of NO_X, SO_X CO, and PM_{10}. Moreover, internal floating roof tanks pose safety concerns for refinery employees, particularly during maintenance activities and should only be used when absolutely required.

PM_{10} – Refinery Cooling Towers

Cooled water is required for a variety of heat exchangers and condensers to service the various items of equipment that will comprise the GME Project, similar to what is used in the existing refinery. In order to reduce the need for cooling water, the existing refinery and the proposed GME process units heavily depend on air cooling, using banks of fin-fans to cool refinery intermediates and products. Four new cooling towers will be constructed for

this purpose. The cooling process will be recirculating in nature and will consist of a forced-draft, wetted-media type tower equipped with advanced drift eliminators. These units circulate warm "return" water through a medium that promotes air/water contact and subsequent cooling by evaporation. The forced ambient air flow carries aerosol droplets or "drift" through the top of the tower, with PM_{10} emissions resulting from the evaporation of dissolved solids in the drift aerosols. Three options exist for controlling PM_{10} emissions from cooling towers: 1) high-efficiency drift eliminators; 2) indirect-contact heat exchangers; and 3) dry cooling towers.

A high-efficiency drift eliminator consists of structured media with tortuous air pathways providing several changes in air flow direction as it passes through the eliminator. These changes promote removal of droplets by coagulation and impaction on the eliminator surfaces. Aerosol generation is reduced with these eliminators to an average 0.0005 percent of circulating water flow, compared to about 0.02 percent for an uncontrolled tower. Compared to conventional mist eliminators, advanced drift eliminators reduce the PM_{10} emission rate by more than 90 percent. This is technically feasible and the preferred control method for a refinery cooling application.

An indirect-contact style tower uses a sealed bank of exchanger tubes, bathed in a circulating water cascade to cool process water. Indirect-contact heat exchangers are not feasible for reduction of PM_{10} emissions. The circulating waterside of the exchanger that is cooled by forced draft is no different from a conventional cooling tower; therefore, drift aerosols will be generated.

A dry cooling tower circulates warm water through a large bank of closed-loop radiator coils. The water is cooled by a forced flow of ambient air on the outer finned surfaces of the radiator. A cross-flow of ambient air is driven through the radiator by axial propeller fans, typically located below the radiator bank so that the warmer air exits the top of the tower.

Dry cooling towers are not effective for refinery usage in the southern U.S. because cooling efficiency during warm-weather months becomes increasingly diminished. Specifically, for refinery purposes, dry tower cooling is only effective when ambient temperature is below 75°F.

Based on the above analysis, MPC Garyville has committed to install a high-efficiency drift eliminator.

VOCs – Refinery Cooling Towers

Hydrocarbons and other contaminants in the circulating cooling water may volatize from the cooling towers when product leaks occur in heat exchangers. This represents a source of VOC emissions that is independent of the aerosol drift rate. Three options exist for controlling VOC emissions: 1) monitoring heat exchangers for VOC emissions; 2) indirect cooling towers; and 3) dry cooling towers.

Monitoring for hydrocarbon leaks into the cooling water from heat exchangers is accomplished using a two-phased approach. Significant leaks are easily detected by a drop in the oxidation reduction potential of the bulk cooling water. This is continuously monitored by instrumentation and alarmed in the Central Control Room. Smaller leaks are found by routine, simplified headspace analysis of return cooling water samples. If either type leak is detected, further samples starting at unit battery limits back to individual exchangers are taken until the leak is found.

VOC emissions cannot occur from an indirect-contact cooling tower. However, because there are multiple banks of heat exchanger tubes within the cooling tower, there is a significant potential for releases of the cooling medium into the atmosphere. This is the result of the large number of metal heat exchanger tubes exposed to the recirculating cooling water with elevated dissolved solids due to evaporative losses. Indirect-contact cooling towers are not technically feasible for most refinery applications and are rarely seen.

As stated above, dry water cooling towers are infeasible for refineries in the southern U.S.

The MPC Garyville Refinery will therefore expand its existing leak detection program to include the GME Project cooling towers.

VOCs – Process Equipment Fugitive Emissions

Fugitive VOC emissions from the hydrocarbon handling equipment in the refinery such as pump seals and valve stems are controlled through the Leak Detection and Repair (LDAR)

program. The MPC Garyville Refinery has a very robust and comprehensive LDAR program that continuously improves from both internal and external audits. At the last LDEQ audit of the refinery's LDAR program, there were no findings of non-compliance.

The primary fugitive emissions control strategy for the GME Project will be to implement the existing LDAR program into the operation of the GME units. In accordance with a federal consent decree, MPC will apply a more stringent definition for leaking components (i.e., 500 ppmv for all components except for pumps in light liquid and heavy liquid service, which must comply with a leak definition of 2,000 ppmv). By complying with this lower leak threshold, fugitive emissions will be avoided to the maximum extent possible. In addition, MPC Garyville recently voluntarily acquired a state-of-the art instrument called a "ThermaCam GasFind IR" that uses thermal imaging to detect vapor leaks. EPA recently published a Proposed Rule to establish an Alternative Work Plan that would allow this technology to be used in place of the existing 25-year-old LDAR detection technology. MPC is in the process of developing a protocol to incorporate this technology into its LDAR program.

Diesel-Powered Equipment

The GME Project will include two new diesel-powered generators, which will only operate during emergency conditions (i.e., power outages). However, on a routine basis, the engine-driven equipment will operate 4 hours per month or less for maintenance and testing to demonstrate readiness. These engines are planned to operate on Diesel No. 2 Fuel.

These generators are critical for controlling emissions in the event of a power outage. If emergency power were not available, it would be necessary to vent hydrocarbons from pressurized units to flares to ensure safe shutdown of the facility.

The engines will emit criteria pollutants associated with diesel combustion. Because the use of the generators is limited to emergency conditions, the emissions for each criteria pollutant are minimal and are estimated to be below 1.0 tpy each. As a result of the minimal emissions, add-on control devices would not be feasible for these emergency sources. Therefore, proper operation and use of low sulfur diesel fuel will avoid adverse environmental effects resulting from the use of this equipment.

PM_{10} – Coke Handling Facility

Petroleum coke is a by-product of the oil refining process. The heavy bottoms from crude oil are heated in the coker furnace to 900°F -1000°F and sent to a coke drum. In the drum, some of the process stream condenses into coke, with the remainder converted to LPG, gasoline, and diesel. Once the coke drum is filled, the removal process is initiated. The drum is cooled, and then the coke is cut from the drum using a high-pressure water jet. Thus, the coke solids are moist even when first removed from the coke drum.

As part of the GME Project, MPC proposes to build a new Coker Unit that is materially similar to the existing Coker Unit. Since the existing coke conveyor system, which transports the petroleum coke from the Coker Unit to barges on the Mississippi River, only operates for 12 hours per day it will not be necessary to build a new conveyor. Instead, the operation of the existing conveyor will be extended to 24 hours per day. The following describes how PM_{10} is controlled on the existing unit and the new unit.

As the coke exits the coke drum with a moisture content between 8 to 12 percent, it slides into the coke pit. The coke pit is enclosed by four walls with 10 to 15 feet of freeboard above the coke pile to minimize particulate emissions. The overhead crane operates within this enclosure below the height of the walls to prevent wind from blowing directly across the coke.

The coke is lifted from the pit by the overhead crane and dropped into a crusher. The coke crushing system is also located within a walled enclosure. Water sprays on the coke pit ensure that the coke moisture content remains between 8 and 12 percent. Effective control of particulate releases from material transfer typically involves the use of water spray systems. The water sprays to those areas having the highest probability of generating fugitive dust.

From the crusher, the coke falls onto a covered conveyor to transport the coke to the barge dock. Any free water from the conveyor system is collected at strategically located sumps and routed to the Waste Water Treatment Plant (WWTP). The crusher and a downstream chute feeding the conveyor are totally enclosed as are the elevated portions of the conveyor traversing roadways.

The coke is not stored at the dock; it is continuously loaded onto the barge. However, paved storage capacity is available within the refinery if there is a temporary loss of barge traffic.

PM_{10} control technologies for refinery coke piles include the use of water sprays, enclosures, and/or baghouses (see Table 5-H-1). MPC is proposing the use of water sprays as well as enclosures during certain steps of the coke handling process. Baghouses offer little incremental improvement when the coke handling facility is equipped with a water spray. The moisture effectively reduces the amount of particulates becoming airborne such that there is very little particulate entrained into the air that can be captured by the baghouse. As previously discussed, ambient air samples that have been collected and analyzed as part of the Refinery's Ambient Air Monitoring Network have indicated that PM_{10} emissions are minimal in nature. Consequently, because of the procedures MPC proposes to employ, emissions from the new Coker Unit will also be similarly minimized.

VOCs –WWTP

WWTP facilities at the MPC refinery that support the GME Project will include a wastewater collection system with components that meet 40 CFR 63 Subpart QQQ requirements, as well as a fifth WWTP train. The fifth WWTP train will operate in parallel with the existing four trains. It will consist of an API Separator, an Equalization Tank, an Induced Gas Flotation (IGF) Unit, a Closed Circuit Cooling Tower (CCCT), an Activated Sludge Biological Reactor (with anoxic zone and acrobic zone), and an Integral Clarifier.

Effluent from the API Separator, where oil and sludge are removed, will flow to the Equalization Tank (external floating roof). The API Separator in the WWTP area will be equipped with a floating roof and seals.

Flow from the Equalization Tank will be routed to the IGF Unit. Off gases from the IGF Unit will be routed to the intake of the aeration blower of the Activated Sludge Biological Reactor and injected into the reactor where they will be consumed. This provides control of VOC emissions from the IGF Unit since the gases containing VOCs are not discharged to the atmosphere.

Effluent from the IGF Unit is sent to the CCCT for required cooling before being sent to the activated sludge treatment process. The CCCT will not have any air emissions, as it is

closed circuit in nature (i.e., the wastewater remains within the heat exchanger instead of being exposed directly to the atmosphere via cascading).

No controls are appropriate for the Activated Sludge Biological Reactor or Integral Clarifier as the majority of the VOCs have been captured prior to these units.

A Thermal Desorption Unit (TDU) is currently used to treat the sludges that have been removed from the wastewater by the primary oil water separation equipment. These sludges are heated in the TDU process to: 1) vaporize any low boiling organic materials that may be present; and 2) dry the material for shipment offsite. The vapor created from this process is routed to the TDU Heatec Heater for destruction. With the addition of the new proposed API Separator, the TDU will experience an increase in throughput.

VOCs – Marine Loading Facility

Crude oil, petroleum intermediates, and refined products are loaded and unloaded at the three existing liquid marine docks. A fourth dock handles coke. As part of the GME Project, loading activities will increase; therefore, this existing source will require a permit limit increase. In addition, as part of the GME Project, Loading Dock No. 3 will be expanded to include loading and/or unloading of ships in addition to the current barge loading. It will be necessary to add a new Marine Vapor Combustor (MVC) in addition to the existing MVC to control VOC emissions from loading.

Loading losses are the primary source of evaporative emissions from marine loading. As petroleum liquids are loaded into marine barges, vapor is displaced. The refinery's current and proposed Marine Vapor Recovery (MVR) system includes vapor recovery and combustion; it will continue to serve as the VOC emissions control method for the dock. The vapor pressure of the product determines if the VOC emissions will be routed to the MVR. MPC will utilize the most stringent available technology, MVR, and will provide a level of control that will be more stringent than required by existing state regulations. Specifically, VOC emissions from products with a true vapor pressure greater than 0.5 psia will be routed to the MVR. This is more stringent than the current state regulation (LAC 33:III.2108) that requires products with a vapor pressure level above 1.5 psia to be controlled by combustion. This practice will significantly minimize adverse effects resulting from marine loading activities.

VOCs – GME Emergency Flare

The GME Project will require an emergency relief system to serve the expansion units. Any hydrocarbon vapors released from pressure relief mechanisms in refinery process vessels will be routed to the emergency flare in the event of a plant unit upset or during a power failure. On a continuous basis, the flares are purged with natural gas to maintain an oxygen free environment within the flare stack. The system will include high and low pressure relief headers, flare knockout drums with pumps, and an elevated steam-assisted flare tip with molecular seal. Proper operations and control mechanisms will be instituted to assure that the flare achieves a control efficiency of 99.5 percent.

An additional flare will be built for the Hydrogen Plant, but because of its low PTE is not subject to BACT.

Comprehensive Emission Reduction – FCCU Regenerator Vent

The existing FCCU converts hydrotreated heavy waxy portions of crude oil (gas oil) into the types of fuels needed by the nation. The gas oil feed to the FCCU and the catalyst both enter the bottom of the reactor. As they rise in the reactor, the gas oil is cracked into gasoline, diesel and other hydrocarbons, and some of the gas oil is laid down as coke on the catalyst. At the top of the reactor, the hydrocarbon and the catalyst disengage, the hydrocarbon is sent to the main fractionator to be separated into its components, and the catalyst flows to the regenerator. The catalyst is regenerated by contact with air to burn off the coke. The regenerator flue gas is sent to the wet scrubber, and the catalyst is recirculated to the reactor. The wet scrubber removes PM_{10} and SO_2 from the flue gas prior to it being released to the atmosphere.

The GME Project will increase conversion or throughput and therefore coke burn in the existing FCCU regenerator. Please note there will be no increase in the permitted firing rate of the FCCU charge heater; however the increase in coke burn rate subjects the FCCU regenerator to a BACT analysis.

NOx – FCCU Regenerator Vent

The existing FCCU regenerator vent emissions are subject to a consent decree agreement between EPA and MPC. The Garyville Refinery recently completed an 18-month catalyst demonstration study for NO_X emissions as required under the consent decree using a low NOx promoter (a post-combustion method). Nitrogen oxide concentrations were reduced from 180 ppmv to 60 ppmv, with 40 ppmv at 0% oxygen to be achieved soon.

Chemical post-combustion treatments including SCR and LoTOx, which uses ozone to promote water insoluble NOx species to soluble NOx species which could be scrubbed in the wet gas scrubber, could reduce NOx emissions from 40 ppmv to 20 ppmv at 0% oxygen; however this minimal reduction in NOx beyond catalyst promotion renders these options economically infeasible.

The Garyville Refinery will use a catalyst additive to lower FCCU NO_X concentrations to 40 ppmv (0% O_2). The FCCU regenerator vent is equipped with a NO_X CEM as required under the consent decree. Catalyst addition and a CEM are currently accepted as BACT and are the most feasible and cost effective control options available, ensuring these emissions will be avoided to the maximum extent possible.

CO and VOC – FCCU Regenerator Vent

The existing FCCU regenerator uses full burn combustion technology which minimizes both CO and VOC emissions to the fullest extent possible. To ensure this, the regenerator vent is monitored by continuous on-line CO and CO_2 analyzers. This technology and instrumentation ensures these emissions are controlled to the maximum extent possible.

PM_{10} and SO_2 – FCCU Regenerator Vent

The existing FCCU regenerator has a wet gas scrubber to control SO_2 and PM_{10} emissions. The wet gas scrubber is accepted BACT for an FCCU regenerator. SO_2 emissions are monitored with a CEM, and PM_{10} emissions are correlated to coke burn rate with stack test data. This technology and instrumentation ensures these emissions are controlled to the maximum extent possible.

8.1.2.2.2 Water Quality

As discussed in the section of this response addressing potential adverse environmental effects during the operating phase, MPC Garyville will incorporate the GME Project operations into its One Plan. Protocols will be in place for responding to accidental releases of oil and hazardous substances (i.e., SPCC), as well as minimizing the potential for discharging pollutants into waters of the state during rainfall events (i.e., SWP^3). Because these potential adverse environmental effects will be avoided to the maximum extent possible, the real adverse environmental effects resulting from accidental releases of oil and hazardous substances, as well as contaminated stormwater discharges from the facility, will also be avoided to the maximum extent possible.

Existing wastewater treatment facilities at the MPC refinery consist of a wastewater collection system with components that meet 40 CFR 63 Subpart QQQ requirements, as well as four parallel wastewater treatment trains. Each train shares a common API Separator. Three of the trains include Dissolved Air Flotation Units for additional primary oil and solids separation. The fourth existing train utilizes an IGF Unit for that purpose. Following primary oil and solids separation, the wastewater is cooled to facilitate nutrient removal. Three of the trains utilize Activated Sludge Biological Reactors followed by Conventional Clarifiers. The fourth train utilizes an Activated Sludge Biological Reactor and an Integral Clarifier. The wastewater treatment system was recently upgraded (i.e., the fourth train was added), and has the capacity to treat larger volumes of wastewater than the amount generated by current operations. As such, it will only be necessary to add a fifth wastewater treatment train (designed similarly to the newer fourth train) to accommodate the additional wastewater volume generated by the GME Project. Based upon estimated volumes from the GME Project, the combined system will still have excess capacity for wastewater treatment. This additional capacity will ensure that the refinery can maintain compliance with its wastewater permit limits in the event that one of the trains or component treatment units must be taken out of service due to malfunction or maintenance. Accordingly, the real adverse environmental effects associated with treated effluent discharged from the facility will be avoided to the maximum extent possible.

Real adverse environmental effects are even more fully avoided due to the ability of the existing and proposed wastewater treatment trains to remove nutrients from the treated effluent. As stated above, the trains include Activated Sludge Biological Reactors that

employ aerobic and anoxic zone technologies. In the aerobic zone, the nitrification process converts ammonia into nitrites, thence to nitrates. In the anoxic zone, nitrates are converted into gaseous nitrogen, which is harmlessly released to the atmosphere (nitrogen is the most abundant gas in the atmosphere, at levels approaching 80%). Nutrient loading into the Mississippi River has been linked to anoxic conditions in the Gulf of Mexico (commonly referred to as the "Dead Zone"). Currently, there is no regulatory requirement to restrict the discharge of nutrients from petroleum refineries into waters of the state. By employing this nutrient removal process, MPC Garyville even further ensures that real adverse effects associated with its operation are avoided to the maximum extent possible.

8.1.2.2.3 Solid and Hazardous Waste

MPC does not treat or dispose of solid or hazardous waste at its Garyville Refinery. This will not change as a result of bringing the GME Project on-line. The programs highlighted in the response language addressing potential adverse environmental effects (i.e., STAR status in OSHA's VPP program, membership in the EPA's NEPT program, etc.) will continue and will apply to the GME Project. While there will be an increase in the generation of non-hazardous solids from the treatment of wastewaters generated by GME operation, the refinery will dewater the solids to reduce volumes that must be shipped offsite. The Garyville Refinery will also continue its significant efforts in the areas of material reuse, recovery and recycling. For example, oily sludges such as those generated from API Separators are sent to the TDU, thus residuals from this process are no longer hazardous. Present hydrotreating catalysts are and additional hydrotreating catalyst will be shipped offsite for metals recovery. Caustic solutions used in the refining process are either treated in the wastewater treatment system or shipped off-site for regeneration and returned to the refinery for further use. Additional efforts are conducted to capture oily residuals in order to return them to the refinery processing system. These practices will be adopted by the GME Project activities. As such, real adverse environmental effects associated with the generation of solid and hazardous wastes will be avoided to the maximum extent possible.

8.1.3 Summary

The MPC Garyville Refinery has demonstrated outstanding safety performance and environmental stewardship as evidenced by its membership in both OSHA's elite VPP Star program, and EPA's elite NEPT program. In addition the rigorous health, environmental,

safety, and security management systems already in place will allow MPC Garyville to achieve continual improvement in these critical areas. This demonstrated outstanding performance and commitment to continual improvement will allow MPC Garyville to construct and operate the GME and avoid both the potential and real adverse environmental effects of the GME Project to the maximum extent possible. At the same time, the GME will bring real benefits to the local community, to the state, and to the nation.

8.2 DOES A COST BENEFIT ANALYSIS OF THE ENVIRONMENTAL IMPACT COSTS BALANCED AGAINST THE SOCIAL AND ECONOMIC BENEFITS OF THE PROPOSED FACILITY DEMONSTRATE THAT THE LATTER OUTWEIGHS THE FORMER?

8.2.1 Environmental Impact Costs

Environmental impact costs stem directly from the adverse environmental effects resulting from the implementation of a project. As demonstrated in Section 8.1, the potential and real adverse environmental effects have been avoided to the maximum extent possible; therefore, environmental impact costs associated with the MPC GME Project will be minimal.

The environmental impact costs from the operation of the MPC GME Project will be avoided to the maximum extent possible because of the MPC Garyville Refinery's commitment to safety, environmental stewardship, and security. This commitment to outstanding performance in these key areas is attested to by OSHA, EPA, and LDEQ through the refinery's membership in the regulators' elite programs: VPP, NEPT, and LaELP. The MPC Garyville Refinery shares membership in VPP and NEPT with only fifty-five other facilities in the nation, and it is the only petroleum refinery in the nation granted NEPT membership by EPA. The management systems that lead to continual improvement, sustained compliance and achievement beyond compliance, employee involvement, and community outreach will ensure that the potential adverse environmental impacts are avoided. These same commitments of excellence along with applying BACT to the new emission point sources of the GME Project will ensure that real adverse environmental effects are avoided to the maximum extent possible. In fact, for several of the larger emission point sources, controls more stringent than that required by the BACT analysis will be provided.

8.2.2 Social Benefits

A shortfall in crude oil refining capacity has contributed to the recent increase in the price of fuels. According to the U.S. Energy Department's Energy Information Administration (EIA) "Primer on Gasoline Prices 2005," due to the dramatic increase in global demand, all sectors of the oil market are being stretched nearly to their limits. On April 11, 2006, EIA released its "Short-Term Energy and Summer Fuels Outlook," predicting average prices for unleaded regular gasoline at $2.62 per gallon. That same day, crude oil prices reached a new seven-month high in the midst of anti-government forces attacking pipelines in Nigeria and Iran's continued persistence in its efforts to enrich uranium. Market volatility is noticeably linked to geopolitical stressors. Further, from a Homeland Security standpoint, the U.S. is vulnerable with respect to its potential inability to meet critical fuel demand needs in the event of a crisis.

Average prices for unleaded regular gasoline are already above the EIA's projected summertime level. The U.S. refining industry cannot meet U.S. demand, and consequently the nation relies on foreign imports of refined fuels. Therefore, no elasticity exists in the fuels supply to absorb any unforeseen events that can decrease production, e.g., fires or hurricanes. Such incidents then cause almost instantaneous fuel price spikes and in some cases fuel shortages. Accordingly, the increased capacity that will be provided by the GME Project will help to lessen this volatility by ensuring that additional supply is available. The positive social and economic effects will be realized regionally and nationally. This is further illustrated in Table 8.2-1.

Table 8.2-1
2005 Light Product Supply and Demand (Thousands of BPD)
(Gasoline, Jet Fuel / Kerosene, Diesel Fuel)

	US Production	Imports	Export / Other	US Demand	Gulf Coast Production	GME Production	% US Production	% Gulf Production	% US Demand	% Imports
Gasoline	7882	1098	118	9125	3602	74	0.9%	2.1%	0.8%	6.7%
Jet Fuel / Kerosene	1603	152	59	1696	798	40	2.5%	5.0%	2.4%	26.3%
Diesel Fuel	3949	327	166	4110	1830	30	0.8%	1.6%	0.7%	9.2%
Total	13434	1577	343	14931	6230	144	1.1%	2.3%	1.0%	9.1%

The above production and demand numbers are from 2005 EIA data. The percent of production, demand and imports assume that both 2005 production and demand stay flat and the GME Project comes on-line in late 2009. In the above table, one can see that the GME Project will lower demand for imported refined product by 9% and will satisfy 1% of the U.S. demand.

The impact of fuel price increases is being seen across all sectors of the economy. On April 19, 2006, the U.S. Labor Department announced that the Consumer Price Index (CPI) rose by 0.4% in March. It reported that this sharp increase (compared to a 0.1% increase in February) was led by a 3.6% jump in gasoline prices during that period. Without expanding U.S. petroleum refining capacity, supplies of fuels will stay flat, but the increased demand may continue to drive fuel prices and the CPI even higher.

In 2005, the impacts of Hurricanes Katrina and Rita further exacerbated the situation by shutting down between 10 and 15 percent of U.S. petroleum refining capacity. Some of this capacity has not yet been brought back on line. According to Colorado State University researchers ("Extended Range Forecast of Atlantic Seasonal Hurricane Activity and U.S. Landfill Strike Probability for 2006"; Gray, W.M. and Klotzbach, P.J.; April, 2006), the 2006 Atlantic hurricane season will be much more active than the average 1950 – 2000 season. They estimate about 9 hurricanes (5.9 average) this year, 17 named storms (9.6 average) and 5 intense Category 3 or higher hurricanes (2.3 average). This projected increase in hurricane activity could create further supply shortages, resulting in less refining capacity and available refined products.

8.2.3 Community Outreach and Involvement

MPC Garyville and its employees are active volunteers in numerous charitable and social programs which benefit the local community. They have contributed and will continue to contribute a great amount of time, effort, and direct financial assistance to many valuable organizations and causes that directly benefit the citizens of the Parish and the surrounding areas. Some examples of the LRD's participation in such efforts are as follows:

- Partnered with local, state, and federal agencies to help accomplish post Katrina response (e.g., providing fuel, sourcing generators, and fire fighting);

- Purchased 30 neighboring residences, including a church. This voluntary program was well received by the community and the EPA Region VI, and was recognized by the LDEQ with a Governor's Award for Community Outreach. The refinery's Health, Environmental, Safety, and Security (HESS) Manager made a presentation on this program to the 2005 EPA Region VI NEPT members meeting;

- United Way Campaign – 2005 Donations totaled $141,879, including corporate and employee contributions. LRD personnel have served as coordinators of the annual St. John United Way Golf Classic, which raised over $55,000 in 2005. In addition, MPC gave a $150,000 contribution to the St. John United Way Katrina Recovery Fund;

- The LRD has adopted Ezekiel Jackson Park in Garyville, LA. Since 2001, MPC Garyville has made park improvements and has annually held a family picnic day providing food, drinks and entertainment for the community. Ezekiel Jackson Park day had over 50 MPC volunteers in 2005;

- Achieved a 3-year recertification of the existing wildlife habitat program from the Wildlife Habitat Council;

- For the 20th year, LRD provided 12 hours of annual training for ~50 local volunteer firemen from the four surrounding fire departments;

- Participated in monthly Community Action Panel meetings to address key issues in the community, including on-site meeting and refinery tour;

- Partnered with River Parishes Hospital to conduct on-site medical surveillance exams for the ERT;

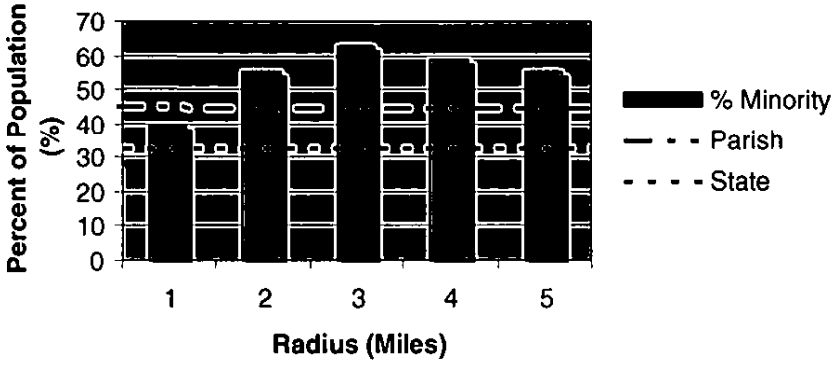
- Sponsored a "Teach for America Corps" teacher at East St. John Elementary School;

- In 2005, 19 families were adopted for Christmas and 450 meals were provided at Thanksgiving for those in need of assistance. Since 1996, in coordination with the St. John Sheriff's Department and St. Charles High School, MPC Garyville has sponsored Thanksgiving Day meals for various Parish residents in need of assistance;

- LRD has aided in the development of the Process Technology and Industrial Mechanical Program at the Louisiana Technical College in Reserve, Louisiana. MPC Garyville has also provided scholarships and other resources for numerous programs. Since 2001, MPC Garyville has sponsored a School to Career Day at the Louisiana Technical College where all 10th grade students (~500 students) in the Parish visit the school to learn about the skills that are necessary to work in industry. In 2005, the LRD gave a presentation and tour of the refinery to ~100 LA Technical College students;
- Held four blood drives in 2005;
- Provided hydrofluoric acid treatment training for community hospital staff; and
- The LRD has adopted East St. John Elementary School. The LRD provides monetary donations to the school, and LRD employees participate in various school activities such as: lab experiments, tutoring, reading programs, and beautification efforts.

In addition, a demographic analysis was conducted to determine whether there would be a disproportionate impact to minorities or economically-disadvantaged residents within the surrounding community. The most recent data available were examined ("Census 2000 Summary File 3"; U.S. Census Bureau; 2002), and it was determined that no such disproportionate impacts will occur. Table 8.2.2 illustrates the percentage of minority residents within a five mile radius of the Garyville Refinery.

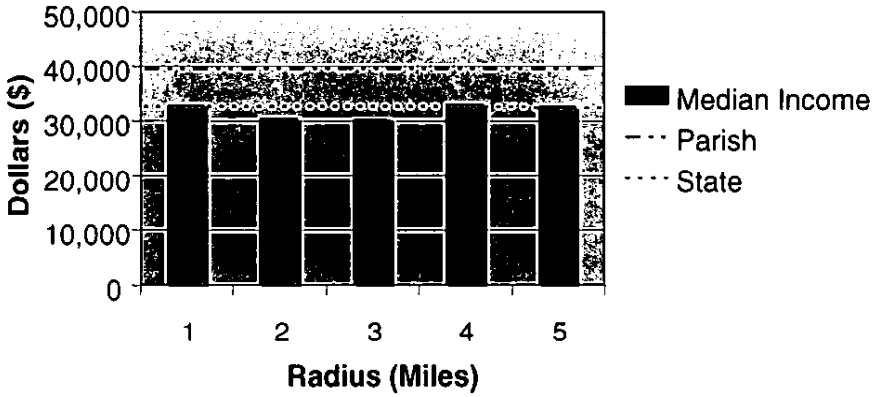
Table 8.2.2
Minority Population Demographics
Within 5 Miles of the MPC Garyville Refinery



As can be seen, minority residents closest to the refinery are not disproportionately affected.

Similarly, Table 8.2-3 illustrates that there is no disproportionate impact to economically disadvantaged residents within the surrounding community.

Table 8.2.3
Median Household Income
Within 5 Miles of the MPC Garyville Refinery



Further, the success in MPC Garyville's effort to minimize impacts to local residents is illustrated in Figure 8-2, which depicts distances from the proposed expansion areas to the nearest households. As can be seen, there are no households located within 800 feet of the expansion areas.

8.2.4 Contributions

The LRD donated $117,257 in 2005 from its Dues & Donations Budget to support local organizations. A partial breakdown of funding for 2005 for local charitable donations is as follows:

$ 42,407	-	Public, Cultural & Scientific
$ 17,000	-	Education (grants/scholarships)
$ 38,700	-	Corporate United Way Donation for 2005
$ 19,150	-	Louisiana Charitable Giving

Representative organizations for which support has been provided include:

Cultural

- St. John Theatre (for various productions)
- River Region Arts and Humanities Council

Historical Preservation

- San Francisco Plantation

Youth Activities

- Ezekiel Jackson Park (adoption and ongoing improvements)
- Summer Witness Program
- St. John Parish Youth Challenge

Education

- East St. John Elementary Adopt-A-School
- LA Technical College
- Teach for America Participation
- LA Engineering Advancement Program (LEAP)
- St. John Honor Roll Round-up to motivate students to excel academically
- Science Screen Report
- River Parishes Education Initiatives member

Philanthropic

- St. John Ministry of Care contribution in lieu of Christmas cards
- St. John United Way
- St. Charles Catholic School Thanksgiving Meal (annually)
- LA Special Olympics
- St. John Association of Retarded Citizens

- Garyville's St. Hubert Catholic Church Sharing
- Our Lady of Grace Church

Other

- National Foundation for Cancer Research
- American Cancer Society (St. John Parish Relay for Life)
- American Heart Association (River Region Gala)
- St. John Sheriff's Bullet Proof Vest Fund

There are no known adverse social costs associated with the MPC Garyville GME Project. The project will involve the expansion of the existing refinery on land already owned by MPC. There is no expectation that noise pollution, light pollution, or other such sensory factors will be increased in detectable amounts that would create a nuisance to nearby residents, scenic, or recreational areas because the area immediately in the vicinity of the LRD facility is sparsely populated and zoned as heavy industrial.

The Garyville GME Project will be situated on property owned by MPC and adjacent to the existing petroleum refinery which has been in operation for many years. Since the property is intended and zoned for industrial use and will be located adjacent to existing petroleum refining units, the addition of the MPC GME Project will not adversely affect neighboring property values. To the contrary, it is anticipated that property values could increase as the result of The Gulf Opportunity Zone Act of 2005 (GO Zone), signed into law by President Bush on December 21, 2005. This statute contains significant economic incentives to rebuild the Gulf Coast, as well as to attract new investments to the affected areas. These incentives are intended to stimulate rapid, private investment within the GO Zone. The MPC Garyville Refinery is within the GO Zone.

The long-term impact on roads is expected to be minimal. Raw materials and products will continue to arrive at the LRD facility by truck, pipeline, rail, barge, and ship and will leave by these same means. There will be an increase in road traffic during construction; however, the increased traffic on US Highway 61 should be manageable, as it is a substantial four-lane highway with adequate shoulders and turn lanes. The MPC GME Project team will work with the St. John the Baptist Parish Sheriff's Office and the LA State Police to minimize the traffic impact on the local community. If necessary, the GME Project will secure remote

parking lots and bus workers to the construction site. The existing road leading from U.S. Highway 61 to the refinery is owned by MPC and is not a public road. To support the GME Project, MPC will add new access from U.S. Highway 61.

Fire protection for the site and associated equipment will be provided by expanding the existing firewater system. The Garyville Refinery maintains a large comprehensive ERT. For further detail on the capabilities of the ERT see Section 8.1. The GME Project will not require any new fire fighting techniques or equipment beyond present capabilities.

There should be no need for additional medical facilities. While permanent employees will reside in local communities, it is anticipated that healthcare needs will be spread out regionally and should not overburden existing providers. In addition, MPC's ERT includes trained EMTs capable of providing care to refinery employees in the event of a health emergency or injury. Similarly, there are no anticipated significant additional costs for schools as a result of this project. In fact,. the economic impact from additional taxes generated will provide increased long-term funds to improve local schools.

The GME Project will be constructed adjacent to an existing petroleum refinery on property zoned for industrial activity. As a result, the construction and operation of the project will not preclude additional economic development in the area, but rather is expected to increase local economic activity.

As demonstrated above, the social benefits that will be provided by the implementation of the Garyville GME Project are substantial, and are not diminished by any adverse social costs.

8.2.5 Economic Benefits

The MPC Garyville Refinery has been in operation for over 30 years at its current location, and currently employs 568 Marathon employees and 345 fixed based contractors with a combined payroll of $61.5 million (without fringe benefits). These wages represent a significant benefit to the local economy. The facility is the largest private employer in the Parish.

The MPC GME Project will provide significant direct and indirect economic benefits to both the Parish and the State of Louisiana. Excluding land costs, the cost for construction will be approximately $2.2 billion. The project will create an average of 2,000 direct jobs, with a peak of 4,000 direct jobs during the construction phase. Permanent jobs will include 150-180 new Marathon jobs and ~75 new fixed based contractor jobs with a combined estimated additional annual payroll of $15.8 million (without fringe benefits). This translates to an annual average salary of ~$68,000, without fringe benefits and ~$95,000, with fringe benefits, for an MPC employee. For contract employees, annual average salary without fringe benefits will be ~$51,000, and ~$72,000 with fringe benefits. This will result in significant additional earnings for households and related businesses throughout Louisiana particularly the Parish, the Baton Rouge and New Orleans metropolitan areas, and the other River Parishes.

To the extent possible, MPC will continue to hire locally. Employment opportunities will be available for all sectors of the Louisiana work force. As a result, there will be significant additional economic benefits to the community in and around the proposed GME Project. MPC Garyville Human Resources personnel will continue their efforts to communicate job opportunities and training requirements at high schools within the region.

To the extent possible, MPC will purchase goods and services locally. The economic benefits occur not only as the result of direct expenses associated with the project, but also as the result of indirect benefits (often referred to as "multiplier" or "ripple" effects). Specifically, direct dollars put into the local economy are in turn spent for goods and services from multiple providers, resulting in a super-additive benefit above the base value of the initial expense.

To quantify these positive impacts, MPC Garyville commissioned James A. Richardson, Ph.D., Alumni Professor of Economics at Louisiana State University to conduct an independent economic impact analysis. According to his analysis, presented as Attachment 8-1, the economic benefit to the Parish and the state will be significant. Dr. Richardson's report presents his findings in detail; some key results are summarized below.

Total construction costs are projected to be $2.2 billion. Dr. Richardson estimates that on average, $73 million per month of construction spending will occur during the 30-month construction period. Excluding spending on specialty equipment and materials that will be

purchased from states other than Louisiana (estimated to total $650 million over the life of the construction project), it is anticipated that over $900 million in direct and indirect business transactions per year will occur within the state over the life of this project. Statewide, there is a projected increase in household earnings of nearly $280 million, representing an average of 5,485 direct and indirect jobs for each year of the construction phase. The average wage for these jobs is estimated to be $50,938.

During the construction phase of the project, the state will collect about $18.4 million in a variety of taxes, including sales and income taxes (this does not include any use tax associated with equipment purchased in other states but installed and used in Louisiana). Local governments will collect approximately $12.3 million in sales and property taxes. These numbers do not include any direct property or sales taxes paid by MPC for the construction of the GME Project.

To further demonstrate its commitment as a proud member of the local community MPC Garyville has elected not to participate in local sales tax exemption programs.

It is estimated that the state will collect an additional $1.64 million in total taxes each year once the GME Project is brought on-line; local governments will collect about $1.1 million in local tax collections. It is estimated that the Parish will receive about $0.5 million of these local tax collections during the operation of the expanded refinery. This will be in addition to the taxes paid directly by MPC, either for property or for equipment purchased and used on the production site.

8.2.6 Summary

As demonstrated herein, as well as in Section 8.1, the environmental impact costs have been minimized to the maximum extent possible. Accordingly, the social and economic benefits resulting from the project overwhelmingly outweigh the environmental impact costs.

8.3 ARE THERE ALTERNATIVE PROJECTS, WHICH WOULD OFFER MORE PROTECTION TO THE ENVIRONMENT THAN THE PROPOSED FACILITY WITHOUT UNDULY CURTAILING NONENVIRONMENTAL BENEFITS?

The goal of the GME Project is to provide critically needed environmentally acceptable fuels for U.S. markets. As lighter, sweet crude oil becomes less available on world markets, the capability to supply these fuels from heavy, sour crude oils becomes increasingly important. These new units along with the existing units at the refinery will provide a unique conversion capability to allow the proposed expanded refinery to accomplish this goal.

A Conceptual-Phase Decision Support Study completed by MPC in 2004 indicated that adding additional crude and coker capacity with other process unit upgrades at one of its existing refineries would be the best option to address the projected increases in demand for refined products (as discussed in detail in Section 8.2). In a Feasibility Phase Study conducted in 2005, MPC determined that the proposed GME Project offered more protection to the environment than any other project without unduly curtailing non-environmental benefits.

The MPC GME Project will integrate a parallel second refining train into the existing refinery. This specific combination of units that provides this unique conversion capability is described below. The following eight major new refinery process units are proposed to be added:

- New Crude/Vacuum Unit
- New Delayed Coker
- New Gas Oil Hydrocracker
- New CCR Platformer
- New Naphtha Hydrotreater
- New Jet Kerosene Hydrotreater
- New Saturate Gas Plant
- New Sulfur Recovery

In addition, the project will include the following elements:

- New Water Treatment and Steam Generation
- New Tankage
- Revamped Dock
- Crude and Product Pipeline Upgrades
- Hydrogen Production

The process of determining the components of the project, as well as unit production rates were evaluated during the Conceptual-Phase Decision Support Study. Eleven different project alternatives were evaluated during the study. Each alternative included a new Coker Unit, a new SRU (Claus Unit and TGTU), a new Sour Water Stripper, and a new Amine Regeneration Unit. These four units are considered the base alternative because any new heavy, sour crude capacity without additional coker capacity to process the heavy bottoms would not allow full conversion to critically needed fuels. Other considerations include:

- Additional crude capacity would require an increase in hydrotreating capacity to remove sulfur to produce environmentally acceptable products. Constructing new hydrotreating units with associated amine absorption requires new amine regeneration;
- The necessity for additional sulfur removal requires an increase in SRU capacity to convert H_2S into elemental sulfur;
- Other base assumptions, besides a balance between crude and coker capacity, are to provide sufficient crude capacity to eliminate the need to purchase outside gas oil on the open market to maximize Fluid Catalytic Cracking Unit (FCCU) throughput; and
- Minimize the necessity to sell intermediates and maximize the sale of finished fuels critically needed by the U.S.

Table 8.3-1 illustrates the differences between each of the alternatives considered.

Table 8.3-1
Unit Configurations for Alternative Projects Considered

Projects	New Crude Unit	Hydrotreater Type	Hydro-cracker	Catalytic Cracker	Alkylation Unit	CCR[1]
AA	No	No	No	No	No	No
A	310 MBD[2]	Kerosene	No	No	No	No
B	325 MBD	Kerosene	No	No	No	No
1A	150 MBD	No	No	No	No	No
1B	150 MBD	Gas[3]	No	No	No	No
1C	150 MBD	Naphtha	No	No	No	Yes
1D	150 MBD	Gas/Naphtha	No	No	No	Yes
1E	150 MBD	Naphtha	Mod Pres.	No	No	Yes
2A	180 MBD	Gas/Nap[4]/Ker[5]	No	No	No	Yes
2B	180 MBD	Nap/Ker	Mod Pres.	No	No	Yes
2C	180 MBD	Gas/Nap/Ker	No	FCCU – Yes	Yes	Yes

[1]CCR = Continuous Catalyst Regeneration Platformer
[2]MBD = Thousand Barrels/Day
[3]Gas = Gas Oil
[4]Nap = Naphtha
[5]Ker = Kerosene

Some of the projects in the table have no stand alone viability, but are necessary to determine feasibility for other projects. Alternative projects were evaluated using linear modeling techniques. Project 2B was selected as the proposed GME Project in comparison to the other alternative projects.

Project AA was ruled out since a new Coker Unit without a new Crude Unit to supply it feed is both technically and economically infeasible, but it does provide valuable model output with which to evaluate other projects. This alternative has fewer emissions than the proposed GME Project (Alternative 2B) because refining capacity would not increase since nothing would be built, not even the base alternative Coker Unit, SRU, or Amine Regeneration Unit. As such, emissions of the existing refinery would remain unchanged. However, this project fails to provide the critically needed fuel supply demonstrated in Section 8.2.

Projects A & B, supply the new Coker Unit with feedstock from a large new Crude Unit. These projects also satisfy the FCCU gas oil feedstock requirement, but the feedstock is of

low quality because no new gas oil hydrotreating capacity is provided.[1] These projects appear to have slightly less emissions than the proposed GME Project because they do not provide the additional upgrading of refinery intermediates into finished critically needed fuels. However, on the contrary, to produce the needed fuels, these intermediates require transportation to another processing facility with available upgrading capacity. Even if the other facility had the advanced environmental controls as the proposed GME Project, the emissions from the required transportation make these alternatives less protective of the environment than the Proposed GME Project.

Project 1A balances the crude and coker capacity. This project also satisfies the FCCU gas oil feedstock requirement, but the feedstock is of low quality because no new additional gas oil hydrotreating capacity is provided. This project appears to have slightly less emissions than the proposed GME Project; however, like the above projects, it still requires transportation of intermediates and their conversion to finished fuels at another facility which result in higher emissions than the proposed GME Project. Further, since the project provides for no additional hydrotreating capacity, it requires the sale of high sulfur intermediates, which makes it economically infeasible.

Project 1B balances the crude and coker capacity. It adds gas oil hydrotreating capacity to supply the FCCU requirement for high quality gas oil feedstock. This project appears to have slightly less emissions than the proposed GME Project; however, like the above projects, it still requires transportation of intermediates and their conversion to finished fuels at another facility which results in higher emissions than the proposed GME Project. Further, since the project provides for no naphtha or kerosene hydrotreating capacity, it requires the sale of high sulfur intermediates, which makes it economically infeasible.

Project 1C balances the crude and coker capacity. This project also satisfies the FCCU gas oil feedstock requirement, but the feedstock is of low quality because no new gas oil hydrotreating capacity is provided. While it supplies additional gasoline by the addition of

[1] High quality FCCU feedstock is gas oil that has been hydrotreated or hydrocracked. The gasoline and diesel products made from this high quality feedstock require little to no further hydrotreating to make environmentally acceptable fuels. The FCCU gasoline and diesel products made from low quality (un-hydrotreated or un-hydrocracked feedstock) will require further hydrotreating to meet environmental fuel specifications. The choices then are to hydrotreat or hydrocrack the gas oil before it goes to the FCCU or to hydrotreat the products. Hydrotreating the products requires building two hydrotreaters, one for gasoline, and one for diesel, instead of building one hydrotreater or hydrocracker for the gas oil feedstock. Building two hydrotreaters would have more environmental impact than building one.

naphtha hydrotreating and CCR, it does not provide kerosene hydrotreating. This project appears to have slightly less emissions than the proposed GME Project; however, like the above projects it still requires transportation of intermediates and their conversion to finished fuels at another facility which result in higher emissions than the proposed GME Project. In addition, the sale of high sulfur intermediates makes the project economically infeasible.

Project 1D balances the crude and coker capacity and provides the FCCU with high quality feedstock. While it supplies additional gasoline by the addition of naphtha hydrotreating and CCR, it does not provide kerosene hydrotreating. This alternative appears to have slightly less emissions than the proposed GME Project; however, like the above projects it still requires transportation of intermediates and their conversion to finished fuels at another facility which result in higher emissions than the proposed GME Project. In addition, the sale of high sulfur intermediates makes the project economically infeasible.

Project 1E balances the crude and coker capacity and provides for additional naphtha hydrotreating and CCR capacity. It introduces a moderate pressure gas oil hydrocracker, which supplies the FCCU with high quality gas oil feedstock, and also provides other additional valuable intermediate upgrades. This project evaluates the differences of gas oil hydrocracking versus gas oil hydrotreating, and does supply additional gasoline, but does not provide for kerosene hydrotreating. This project appears to have slightly less emissions than the proposed GME Project; however, like the above projects it still requires transportation of intermediates and their conversion to finished fuels at another facility which result in higher emissions than the proposed GME Project. In addition, the sale of high sulfur intermediates makes the project economically infeasible.

Projects 2A & B both balance crude and coker capacity and make the final evaluation between the gas oil hydrotreating and hydrocracking for supplying high quality feedstock to the FCCU. Full hydrotreating capacity for naphtha and kerosene is provided along with additional CCR capacity. Both alternatives maximize the yield of critically needed fuels and substantially have the same emissions. Project 2B gives some higher fuel yields compared to 2A and also provides more flexibility shift between fuels. Because these alternatives eliminate the need for transportation of intermediates they provide critically needed environmentally acceptable fuels at the lowest emission rates of any of the projects.

Project 2C evaluates an alternative that yields the same critically needed fuels that 2B does, but it does so by increasing FCCU capacity and Alkylation Unit capacity. While this project provides some benefits it was rejected since it has much higher emissions.

The detailed design effort for the GME Project will be executed by Fluor Corporation, one of the world's largest, publicly owned engineering, procurement, construction, and maintenance services organizations. MPC engineering standards and oversight activities mandate that the technologies selected and the design specifications meet or exceed applicable code-of-practice requirements. Thus, reliability of the technologies and design criteria will be ensured.

As demonstrated in Section 8.1, the technologies selected for the GME Project will avoid adverse environmental effects to the maximum extent possible. There will be no compatibility problems with respect to any interconnections with existing equipment, as the existing refinery complex is the newest grass-roots refinery in the U.S. As such, there are no alternative projects which would offer more protection to the environment than the proposed facility without unduly curtailing non-environmental benefits.

8.4 ARE THERE ALTERNATIVE SITES, WHICH WOULD OFFER MORE PROTECTION TO THE ENVIRONMENT THAN THE PROPOSED FACILITY SITE WITHOUT UNDULY CURTAILING NON-ENVIRONMENTAL BENEFITS?

MPC determined that it would be advantageous to expand its U.S. refining capacity to provide critically needed environmentally acceptable fuels to the U.S. market. This could be accomplished by either: 1) constructing a new grass-roots facility (i.e., a facility constructed on an undeveloped tract of land); or 2) expanding one or more of its existing refineries. Constructing a new grass-roots facility was deemed unacceptable for the following reasons.

- MPC's existing refineries are located in areas already zoned for industrial activity.
- The environmental costs of developing a grass-roots facility are not limited to the footprint of the refinery itself. New infrastructure would have to be developed to accommodate raw material delivery and finished product shipments. This includes, but is not limited to: land for roadways; rail access;

dock access; liquid pipelines; gas pipelines etc. In addition, refineries require significant infrastructure to ensure that a reliable source of electric power is available. Acreage for transmission lines and substations must also be considered.

Conceptual/Feasibility studies to increase the supply of critically needed fuels included all of MPC's refineries. A project the size of the proposed GME Project could not be implemented at several of the other MPC refineries because there is not enough available land at those facilities.

Of the remaining refineries, MPC selected Garyville for this expansion project because of its existing infrastructure, history of successful project execution, and sustained record of environmental compliance.

The key components of the existing infrastructure include:

- Transportation
  - The site is located adjacent to the Mississippi River. It has four existing docks located on the river.
  - The refinery is served by multiple hydrocarbon pipelines which supply raw materials and move products to numerous market locations.
  - The refinery can receive crude oil from the Louisiana Offshore Oil Port (LOOP) which gives the refinery easy access to world crude supplies. MPC is the majority owner of LOOP.
  - The refinery is served by two railroads.
  - The refinery has direct access to a four-lane sub-divided U.S. highway and a two lane state highway.
  - The refinery is 25 miles from a major international airport.
- Utilities

- The Mississippi River provides a year-round supply of water for cooling, plant use, potable use, and fire fighting; therefore, no additional water storage ponds or reservoirs will be required.
- The Mississippi River is not impaired for any water quality standards that would be affected by the operation of a petroleum refinery.
- The refinery is supplied electricity from three separate power generating stations through three separate feeds.
- The refinery is also connected to hydrogen and oxygen pipelines.

As the newest refinery in the U.S., MPC Garyville offers environmental advantages that are not available at other MPC locations. Specifically, the Garyville Refinery was built in compliance with all applicable NSPS requirements. It has an unparalleled record of safety and environmental stewardship. The Garyville Refinery is located in a NAAQS attainment area; the GME Project will be constructed on a site that is already zoned for heavy industrial activity, and no known archaeological sites will be impacted.

The proposed expansion site is located on land immediately adjacent to the existing Garyville Refinery. It is not located adjacent to or in the vicinity of any estuarine bodies. The proposed site will not have an impact on any sensitive wildlife. No threatened or endangered species have been identified within the area of the project. The site is over 100 kilometers away from the Breton Sound Class I Wildlife Management Area. The site is not within the Louisiana Coastal Management Zone. Wildlife populations present at the proposed site are not substantial in terms of numbers, as the majority of the site has been cultivated for sugar cane production.

The proposed GME Project and the existing Garyville Refinery are located in an area zoned industrial, and are in an enterprise zone.

Based on the most current Flood Insurance Rate Map of the Parish, the proposed GME Project will be located above the 100-year floodplain, and is not subject to frequent flood hazards. The elevation of the site is approximately 5-20 feet above the National Geodetic Vertical Datum. No additional diking is required. An existing Mississippi River levee protects the refinery from river flooding.

With respect to hurricanes, the site sustained only minor damage during Hurricane Katrina in 2005. Only a few pieces of insulation required replacement. The site is not subject to storm surge; wave action is not considered a threat because of the site elevation and distance (over 60 miles) from the nearest shoreline. The GME Project will be designed to be protected from a 10-year, 24-hour storm event, assuming an intensity of 3 inches per hour over a 4-hour period. With respect to wind speed design, the lateral forces exerted by wind on vessels, buildings, and structures will be calculated using pressures taken from Section 2311 of the latest edition of the Uniform Building Code accepted by the local governing body.

The aquifers underlying the MPC LRD, as well as the proposed GME Project, include the "Shallow Aquifer," the Gramercy Aquifer, the Norco Aquifer, and the Gonzales-New Orleans Aquifer. None of the aquifers are used for drinking water. A total of 21 wells have been installed at the existing MPC site to monitor groundwater as required by LDEQ regulations. To date, no release to the groundwater beneath the site has been detected. Based on historical knowledge of the proposed construction areas, there is no indication that subsurface impacts of anthropogenic origin exist at the site.

Other synergies associated with selecting MPC Garyville for the expansion project are related to its performance record. The Garyville Refinery can process heavier and sourer crude slates than the other facilities. Garyville's infrastructure system is the newest among the MPC refinery assets. It has an outstanding track record in business management, including, but not limited to, the successful implementation of Environmental and Safety Management Systems. The goal of these systems is not simply status quo, rather, the goal is continual improvement. Garyville's production cost on a per-barrel basis is among the lowest in the U.S. Its operation and maintenance cost per barrel of throughput is also among the lowest in the U.S. In addition, its operational reliability is among the best in the industry.

As such, there are no alternative sites which would offer more protection to the environment than the proposed facility site without unduly curtailing non-environmental benefits.

8.5 ARE THERE MITIGATING MEASURES WHICH WOULD OFFER MORE PROTECTION TO THE ENVIRONMENT THAN THE FACILITY AS PROPOSED WITHOUT UNDULY CURTAILING NON-ENVIRONMENTAL BENEFITS?

The MPC Garyville Refinery is the newest and therefore one of the most highly regulated petroleum refineries in the U.S. The Garyville facility was placed in service in 1976, the same year the NSPS were promulgated by the EPA. As a result, the refinery was designed and constructed with state-of-the-art pollution abatement equipment to meet these stringent standards. Consequently, none of the units required "grandfather" status because they all met or exceeded regulatory requirements at that time. The refinery was constructed and continues to operate in a manner that ensures that the potential and real adverse environmental effects are avoided to the maximum extent possible.

The Garyville Refinery's commitment to environmental excellence, which ensures that the real and potential adverse environmental effects are avoided to the maximum extent possible, is evidenced by its 2002 induction into the NEPT program. This program was designed by the EPA to recognize companies for their achievements beyond compliance. The cornerstones of the program are a record of sustained compliance, community outreach, and an environmental management system that leads to continual improvement. Garyville is the first and only refinery in the nation accepted into this program. These cornerstones will allow the MPC Garyville Refinery to construct and operate the proposed GME Project and ensure that potential and real adverse environmental effects are minimized to the maximum extent possible (for detail see Section 8.1).

Safety and environmental stewardship are priorities at the MPC Garyville Refinery. The refinery is a member of OSHA's elite program, the VPP. It is also a member of EPA's elite program, the NEPT. The MPC Garyville Refinery has maintained STAR status in the VPP program since 1994. STAR status is the highest ranking available within the VPP, and is awarded only to exemplary worksites that have implemented comprehensive, successful safety and health management systems, and achieved injury/illness rates below their industry's national average. The NEPT is a voluntary partnership that recognizes top environmental performance among participating U.S. facilities of all types, sizes, and complexity. It includes both public and private facilities. Program partners are providing leadership in many areas, including preventing pollution at its source. Currently, the program has about 400 members. To date, the LRD is the only petroleum refinery that has

been inducted into the partnership. Only fifty-five other facilities in the U.S. share the privilege of membership in both VPP and NEPT. Cornerstones of both VPP and NEPT are management systems that lead to continual improvement.

The MPC Garyville Refinery will continue to be a leader in pollution prevention and environmental stewardship, not only locally but also nationally. As a recipient of twelve Governor's Environmental Leadership Program awards since the inception of the program in 1996, the dedication of the facility's entire workforce to environmental stewardship is unparalleled. The goal of MPC Garyville's Environmental and Safety Management Systems is not to maintain the status quo, but to be fully dedicated to continual improvement.

There are no other mitigating measures that would offer more protection to the environment without unduly curtailing non-environmental benefits than what has been described in Section 8.1. As demonstrated above, the MPC Garyville Refinery is exemplary in its environmental stewardship. Below are noteworthy examples:

- The refinery has an ambient air monitoring network consisting of three ambient air monitoring stations installed in March 2003 that are used to ensure the safety and health of adjacent communities. Since installation, no violations of applicable standards have been detected. These ambient air monitoring stations were voluntarily installed by MPC. The data are shared with the LDEQ and the local Community Action Panel;
- The refinery's Air Monitoring Team is trained to use air monitoring instruments to do both fenceline and community monitoring in response to odor complaints and emergency incidents;
- A new wastewater treatment train will be constructed and operated to ensure that the refinery has an overabundance of capacity for treating refinery wastewaters. Real adverse environmental effects are fully avoided due to the ability of the existing and proposed wastewater treatment trains to remove nutrients from the treated effluent. Nutrient loading into the Mississippi River has been linked to anoxic conditions in the Gulf of Mexico (commonly referred to as the "Dead Zone"). Currently, there is no regulatory requirement to restrict the discharge of nutrients from petroleum refineries into waters of the state.

The management systems that lead to continual improvement, sustained compliance and achievement beyond compliance, employee involvement, and community outreach will ensure that the potential adverse environmental impacts are avoided. These same commitments of excellence along with applying BACT to the new emission point sources of the GME will ensure that real adverse environmental effects are avoided to the maximum extent possible. In fact, for several of the larger emission point sources, controls more stringent than that required by the BACT analysis will be provided as follows:

- By incorporating SCR in combination with ULNBs for five of the largest heaters proposed for the GME Project, MPC Garyville will provide the very best NO_X control capability that is available. No other technologies offer more protection to the environment.

- MPC Garyville has committed to a fuel gas sulfur limit of 25 ppmv as H_2S on an annual average, which is significantly below the NSPS and BACT requirements. There is no other mitigating measure that can further reduce sulfur emissions without unduly curtailing non-environmental benefits.

- BACT for sulfur conversion has been established at a range between 95.0 and 99.9 percent. MPC Garyville has committed to achieve 99.9 percent conversion efficiency – the very best attainable. The maximum 0.1 percent unreacted sulfur in the form of waste gases containing a small amount of unabsorbed H_2S will be combusted to SO_2 in the Thermal Oxidizer at the end of the TGTU. The maximum 0.1 percent unreacted sulfur is the NSPS, and presently the Garyville Refinery is far below that required by the NSPS. In order to stay below, the NSPS the Garyville Refinery recently retrofitted its existing three SRUs with steam fired reheat on the sulfur condensers and added increased amine recirculation in the TGTU. The GME SRUs will also be constructed to be below NSPS.

- A significant enhancement to minimizing SO_2 emissions resulting from SRU operational difficulties is accomplished through both oxygen enrichment and the refinery's sulfur shedding strategy (for details see Section 8.1).

- To control H_2S emissions, MPC Garyville will de-gas the liquid sulfur product by vacuum at the point where it exits the Claus trains. The sulfur pit

tank will also be equipped with a steam-driven ejector to draw sweep air from the vessel headspace. This vent stream will capture volatilized H_2S, and routed back to the front end of the SRU and converted to elemental sulfur. These two measures represent the most stringent commercially-available options for H_2S control from this type of source.

- MPC Garyville recently voluntarily acquired a state-of-the art instrument called a "ThermaCam GasFind IR" that uses thermal imaging to detect vapor leaks. EPA recently published a Proposed Rule to establish an Alternative Work Plan that would allow this technology to be used in place of the existing 25-year-old LDAR detection technology. MPC is in the process of developing a protocol to incorporate this technology into its LDAR program.

- Diesel-powered back-up generators are included in the GME Project. It is important to note that these generators are critical for controlling emissions in the event of a power outage. If emergency power were not available, it would be necessary to vent hydrocarbons from pressurized units to flares to ensure the safe shutdown of the facility.

- MPC will utilize the most stringent available technology for marine vapor recovery. This technology will provide a level of control that will be more stringent than required by existing state regulations. Specifically, VOC emissions from products with a true vapor pressure greater than 0.5 psia will be routed to the MVR Unit. This is more stringent than current state regulation requires. For marine vapor recovery, there is no other mitigating measure that would offer more protection to the environment than the facility as proposed.

- Wastewater from the IGF cells is sent to a CCCT for required cooling before being sent to the activated sludge treatment process. The CCCT will not have any air emissions, as it is closed circuit in nature (i.e., the wastewater remains within the heat exchanger instead of being exposed directly to the atmosphere via cascading). This will significantly reduce VOC emissions beyond current regulatory requirements.

In addition to the above-described mitigating measures, although not required by regulation, MPC Garyville will install NO_X CEMs on the thirteen process heaters with design firing

rates above 100 MM BTU/hr. This will provide an even greater assurance that NO_X emissions will be minimized to the maximum extent possible.

The MPC LRD has planned the GME Project such that the environmental effects of the proposed construction and operation activities will be mitigated to the maximum extent possible. Accordingly, there are no other mitigating measures which would offer more protection to the environment than the facility as proposed without unduly curtailing non-environmental benefits.